



**BIRDS OF
NEW
MEXICO**

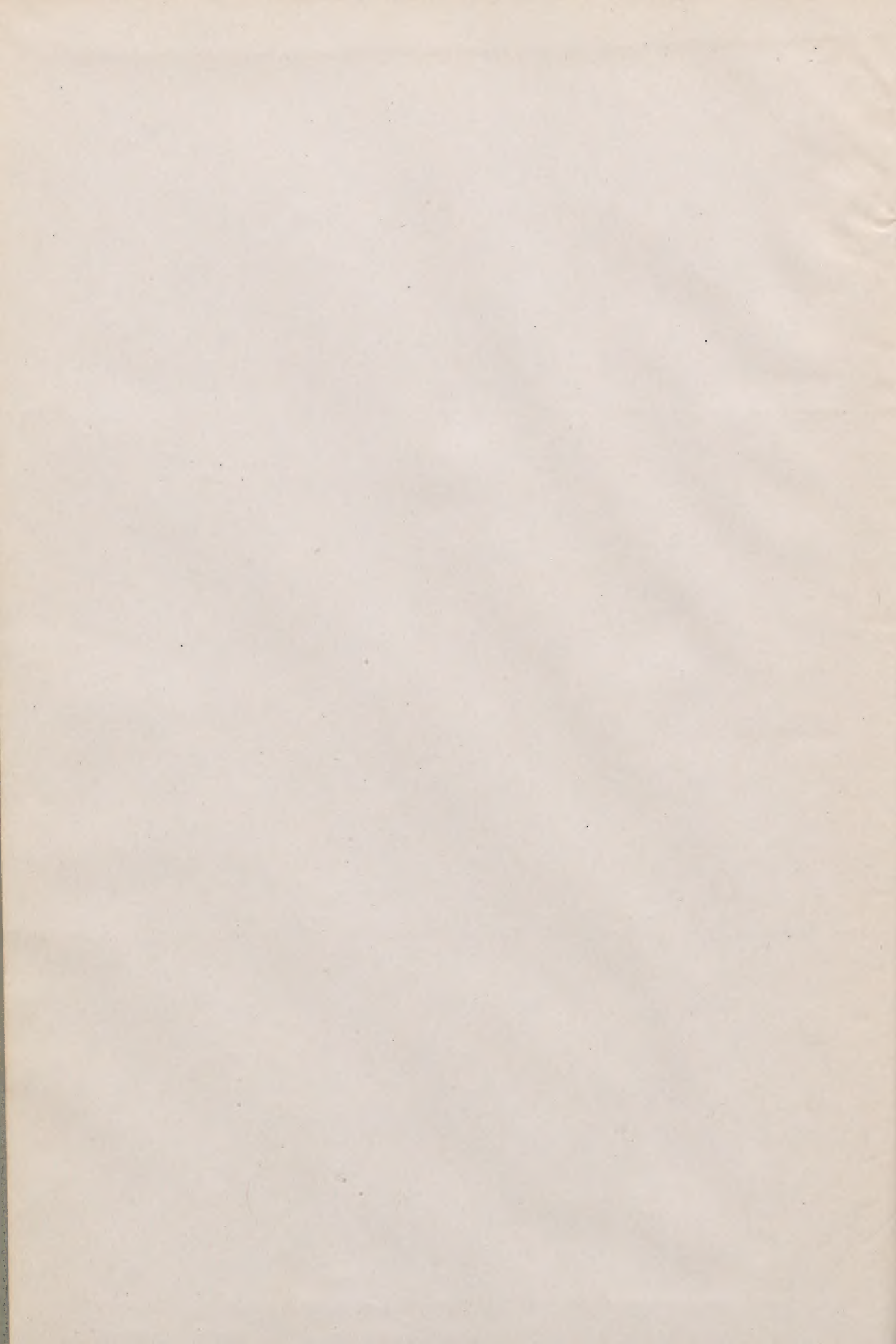




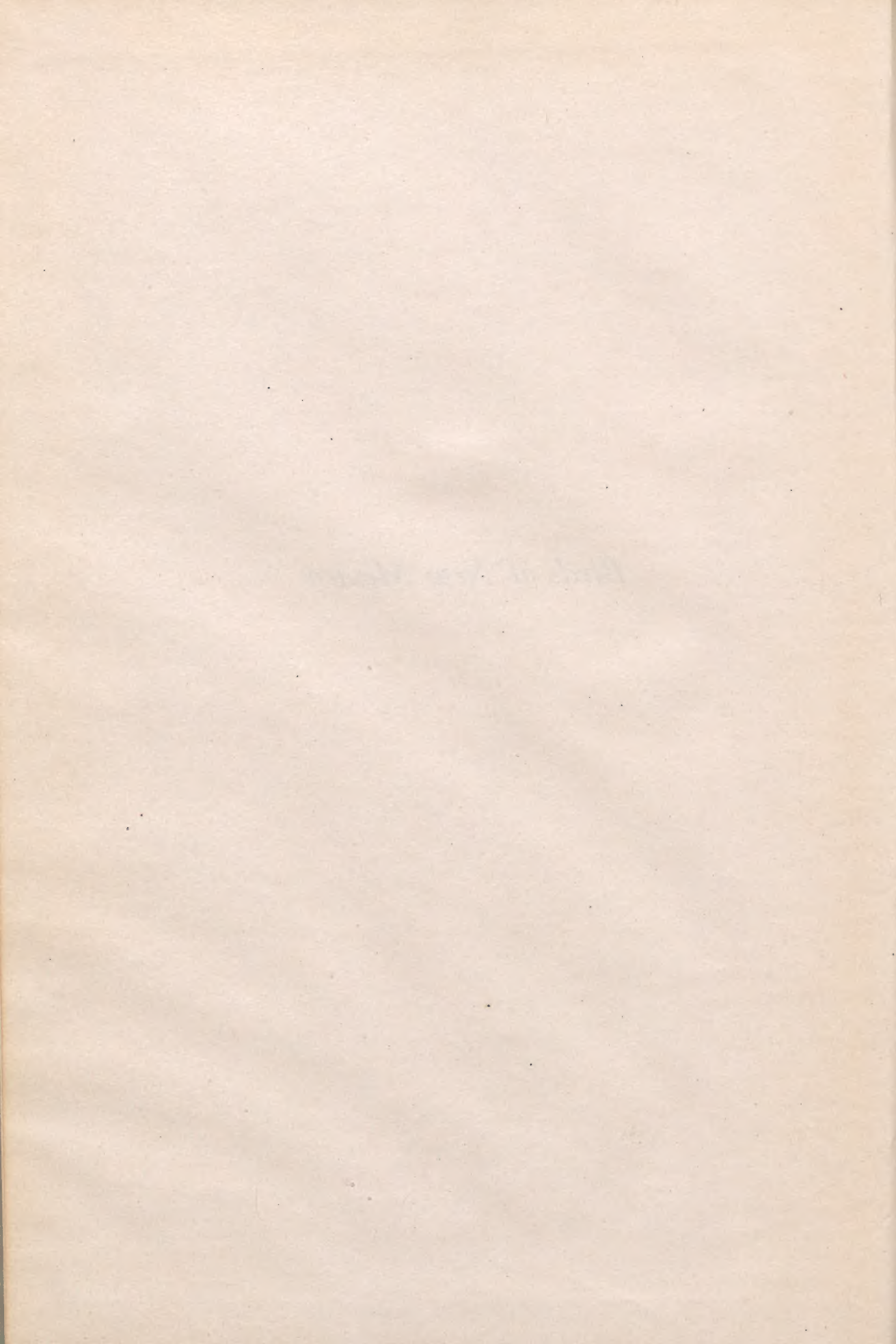
Museum Victoria



54828



Birds of New Mexico





PAINTED REDSTART

RED-FACED WARBLER

51/50

NEW MEXICO

By

F. MERRIAM BAILEY

FIELD OF THE WESTERN UNIT

with Contributions by the Late

WILLIS WOODBRIDGE COOKE

ASSISTANT BIOLOGIST OF THE BUREAU

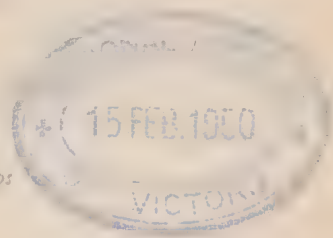
Illustrated with Colored Plates by

ALLAN BROOKS

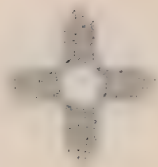
Plates and Text Figures by the Late

LOUIS AGASSIZ FUERTES

and many Other Cuts from Drawings, Photographs, and Maps



BASED MAINLY ON FIELD WORK OF THE BUREAU
BIOLOGICAL SURVEY, UNITED STATES
DEPARTMENT OF AGRICULTURE





PAINTED REDSTART

RED-FACED WARBLER

51/50

BIRDS OF NEW MEXICO

By

FLORENCE MERRIAM BAILEY

AUTHOR OF HANDBOOK OF BIRDS OF THE WESTERN UNITED STATES

With Contributions by the Late

WELLS WOODBRIDGE COOKE

FORMERLY ASSISTANT BIOLOGIST OF THE BIOLOGICAL SURVEY

Illustrated with Colored Plates by

ALLAN BROOKS

Plates and Text Figures by the Late

LOUIS AGASSIZ FUERTES

And Many Other Cuts from Drawings, Photographs, and Maps



BASED MAINLY ON FIELD WORK OF THE BUREAU
OF BIOLOGICAL SURVEY, UNITED STATES
DEPARTMENT OF AGRICULTURE



*Published by the NEW MEXICO DEPARTMENT OF GAME AND FISH in Cooperation
with the STATE GAME PROTECTIVE ASSOCIATION and the
BUREAU OF BIOLOGICAL SURVEY*

1928

PRESS OF
JUDD & DETWEILER, INC.
WASHINGTON, D. C.

THE PUBLICATION of this book by the New Mexico Department of Game and Fish in cooperation with the State Game Protective Association and the Bureau of Biological Survey of the United States Department of Agriculture is made possible through the kindly interest and financial assistance of Mr. and Mrs. George Deardorff McCreary, Jr., of Silver City, New Mexico.

PREFACE

THE connection of the Biological Survey with the present volume began in 1889, when Vernon Bailey, field naturalist of the Division of Ornithology and Mammalogy, as the Survey was then called, spent several weeks in making collections and observations in New Mexico, under the direction of the first chief of the Bureau, Dr. C. Hart Merriam. Beginning in 1903, Mr. Bailey was detailed to make a biological survey of New Mexico, and he with Mrs. Bailey and various members of the Survey devoted several field seasons to the work of collecting specimens and notes on the birds and other wild life of the State. Several years ago, during the administration of Henry W. Henshaw, the late Wells W. Cooke was detailed to bring together for publication all available data on the bird life of the State, under the direction of Dr. E. W. Nelson, then chief of the Bureau's division of biological investigations. This task, when nearing completion, was interrupted by the death of Professor Cooke.

For some time the work remained unfinished. Then Mrs. Bailey, whose extensive publications on western birds included important original contributions on the birds of New Mexico, was asked by Doctor Nelson, at that time chief of the Bureau, to bring the report to date. The scope of the work was then enlarged, and the resulting book, the first comprehensive report on the bird life of the Southwest, is herewith presented. Its publication has been made possible through the efforts of the New Mexico Department of Game and Fish and the State Game Protective Association, aided by the generous cooperation of other interested organizations and individual citizens of New Mexico.

PAUL G. REDINGTON,
Chief, Biological Survey.

BUREAU OF BIOLOGICAL SURVEY,
U. S. DEPARTMENT OF AGRICULTURE,
WASHINGTON, D. C.
OCTOBER 31, 1928.

ERRATA

PAGE

156. For *Astur atricapillus striatulus*, read *Astur atricapillus striatulus*.
291. For *Larus pepixcan*, read *Larus pipixcan*.
397. For *Sphyrapicus thryoideus nataliae*, read *Sphyrapicus thryoideus nataliae*.

CONTENTS

	PAGE
INTRODUCTION—By Florence Merriam Bailey.....	1
Acknowledgments	1
Distribution of Birds in New Mexico.....	5
Zonal Distribution of Breeding Birds.....	6
Lower Sonoran Zone.....	6
Upper Sonoran Zone.....	7
Transition Zone.....	7
Canadian Zone.....	8
Hudsonian Zone.....	8
Arctic-Alpine Zone.....	8
Value of Birds to the State.....	8
National and State Refuges and State Organizations for the Conservation of Wild Life.....	9
National and State Refuges.....	9
State Organizations.....	10
Birds First Described from New Mexico.....	11
Fossil Birds Found in New Mexico.....	13
Location of Collections Made in New Mexico.....	13
ITINERARIES AND REPORTS OF FIELD WORK IN THE STATE—By Wells Woodbridge Cooke.....	15
LOCALITIES VISITED BY OBSERVERS—By Wells Woodbridge Cooke....	37
GLOSSARY OF TECHNICAL TERMS (after Ridgway).....	69
BIRDS OF NEW MEXICO—By Florence Merriam Bailey, with State Records by Wells Woodbridge Cooke ¹	73
LOONS: ORDER GAVIIFORMES.....	73
Loons: Family Gaviidae.....	73
Loon: <i>Gavia immer</i>	73
Pacific Loon: <i>Gavia arctica pacifica</i>	74
GREBES: ORDER COLYMBIFORMES.....	75
Grebes: Family Colymbidae.....	75
Horned Grebe: <i>Colymbus auritus</i>	75
American Eared Grebe: <i>Colymbus nigricollis californicus</i>	76
Western Grebe: <i>Aechmophorus occidentalis</i>	79
Pied-billed Grebe: <i>Podilymbus podiceps podiceps</i>	80
PELICANS, CORMORANTS, DARTERS, ETC.: ORDER PELECANIFORMES.....	83
Pelicans: Family Pelecanidae.....	83
American White Pelican: <i>Pelecanus erythrorhynchos</i>	83
Cormorants: Family Phalacrocoracidae.....	84
Mexican Cormorant: <i>Phalacrocorax vigua mexicanus</i>	84
Darters: Family Anhingidae.....	86
Water Turkey: <i>Anhinga anhinga</i>	86
HERONS, STORKS, IBISES, ETC.: ORDER CICONIIFORMES.....	86
Hérons, Bitterns, etc.: Family Ardeidae.....	86
Hérons and Egrets: Subfamily Ardeinae.....	87
Treganza Blue Heron: <i>Ardea herodias treganzai</i>	87
Snowy Heron: <i>Egretta thula thula</i>	90
Green Heron: <i>Butorides virescens virescens</i>	92
Black-crowned Night Heron: <i>Nycticorax nycticorax naevius</i>	93

¹ Species inclosed in brackets in the list of the birds of New Mexico are of doubtful occurrence in the State and are included as hypothetical.

BIRDS OF NEW MEXICO

	PAGE
HERONS, STORKS, IBISES, ETC.: ORDER CICONIIFORMES—Continued.	
Bitterns: Subfamily Botaurinae.....	95
American Bittern: <i>Botaurus lentiginosus</i>	96
Least Bittern: <i>Ixobrychus exilis</i>	97
Storks and Wood Ibises: Family Ciconiidae.....	98
Wood Ibises: Subfamily Mycteriinae.....	98
Wood Ibis: <i>Mycteria americana</i>	98
Ibises: Family Threskiornithidae.....	99
Subfamily: Threskiornithinae.....	99
[Scarlet Ibis: <i>Guara rubra</i>].....	100
White-faced Glossy Ibis: <i>Plegadis guarauna</i>	100
DUCKS, ETC.: ORDER ANSERIFORMES.....	102
Ducks, Geese, and Swans: Family Anatidae.....	102
Swans: Subfamily Cygninae.....	103
Whistling Swan: <i>Cygnus columbianus</i>	103
[Trumpeter Swan: <i>Cygnus buccinator</i>].....	104
Geese: Subfamily Anserinae.....	104
Canada Goose: <i>Branta canadensis canadensis</i>	104
[Hutchins Goose: <i>Branta canadensis hutchinsii</i>].....	106
White-fronted Goose: <i>Anser albifrons gambeli</i>	107
Snow Goose: <i>Chen hyperboreus hyperboreus</i>	107
River Ducks: Subfamily Anatinae.....	108
Mallard: <i>Anas platyrhynchos platyrhynchos</i>	109
New Mexican Duck: <i>Anas diazi novimexicana</i>	114
Gadwall: <i>Chaulelasmus streperus</i>	115
Baldpate: <i>Mareca americana</i>	116
American Pintail: <i>Dafila acuta tzitzihua</i>	118
Green-winged Teal: <i>Nettion carolinense</i>	121
Blue-winged Teal: <i>Querquedula discors</i>	124
Cinnamon Teal: <i>Querquedula cyanoptera</i>	126
Shoveller: <i>Spatula clypeata</i>	128
Wood Duck: <i>Aix sponsa</i>	130
Sea Ducks: Subfamily Fuligulinae.....	131
Redhead: <i>Nyroca americana</i>	132
Canvasback: <i>Nyroca valisneria</i>	134
American Scaup Duck: <i>Nyroca marila</i>	136
Lesser Scaup Duck: <i>Nyroca affinis</i>	136
Ring-necked Duck: <i>Nyroca collaris</i>	138
American Golden-eye: <i>Glaucionetta clangula americana</i>	139
Buffle-head: <i>Charitonetta albeola</i>	141
White-winged Scoter: <i>Melanitta deglandi</i>	142
Spiny-tailed Ducks: Subfamily Erismaturinae.....	142
Ruddy Duck: <i>Erismatura jamaicensis rubida</i>	142
Mergansers: Subfamily Merginae.....	145
Hooded Merganser: <i>Lophodytes cucullatus</i>	145
American Merganser: <i>Mergus americanus</i>	147
Red-breasted Merganser: <i>Mergus serrator</i>	148
VULTURES, HAWKS, AND EAGLES: ORDER FALCONIFORMES.....	150
American Vultures: Family Cathartidae.....	151
Turkey Vulture: <i>Cathartes aura septentrionalis</i>	151
Hawks, Eagles, Kites, etc.: Family Accipitridae.....	154
Subfamily Perninae.....	154
Swallow-tailed Kite: <i>Elanoides forficatus</i>	154
Subfamily Milvinae.....	155
Mississippi Kite: <i>Ictinia mississippiensis</i>	155
Hawks: Subfamily Accipitrinae.....	156
Western Goshawk: <i>Astur atricapillus striatulus</i>	156
Sharp-shinned Hawk: <i>Accipiter velox</i>	157
Cooper Hawk: <i>Accipiter cooperi</i>	160

CONTENTS

xi

VULTURES, HAWKS, AND EAGLES: ORDER FALCONIFORMES--Continued.	PAGE
Buzzard Hawks and Eagles: Subfamily Buteoninae.....	116
Western Red-tail: <i>Buteo borealis calurus</i>	161
Red-bellied Hawk: <i>Buteo lineatus elegans</i>	164
Zone-tailed Hawk: <i>Buteo albonotatus albonotatus</i>	165
Swainson Hawk: <i>Buteo swainsoni</i>	167
American Rough-legged Hawk: <i>Triorchis lagopus sancti-johannis</i>	170
Ferruginous Rough-leg: <i>Triorchis ferrugineus</i>	172
Harris Hawk: <i>Parabuteo unicinctus harrisi</i>	173
Mexican Goshawk: <i>Asturina plagiata</i>	175
Mexican Black Hawk: <i>Morphnus anthracinus</i>	175
Golden Eagle: <i>Aquila chrysaetos</i>	176
Bald Eagle: <i>Haliaetus leucocephalus leucocephalus</i>	180
Harriers: Subfamily Circinae.....	181
Marsh Hawk: <i>Circus hudsonius</i>	181
Ospreys: Subfamily Pandioninae.....	184
American Osprey: <i>Pandion haliaetus carolinensis</i>	184
Falcons and Caracaras: Family Falconidae.....	185
Caracaras: Subfamily Polyborinae.....	186
Audubon Caracara: <i>Polyborus cheriway auduboni</i>	186
Falcons: Subfamily Falconinae.....	187
Prairie Falcon: <i>Falco mexicanus</i>	187
Duck Hawk: <i>Falco peregrinus anatum</i>	189
Aplomado Falcon: <i>Falco fusco-coerulescens septentrionalis</i>	191
Pigeon Hawk: <i>Falco columbarius columbarius</i>	192
Richardson Pigeon Hawk: <i>Falco columbarius richardsoni</i>	193
Desert Sparrow Hawk: <i>Falco sparverius phalaena</i>	193
GALLINACEOUS BIRDS: ORDER GALLIFORMES.....	196
Grouse, Ptarmigans, etc.: Family Tetraonidae.....	196
Dusky Grouse: <i>Dendragapus obscurus obscurus</i>	196
Southern White-tailed Ptarmigan: <i>Lagopus leucurus altipetens</i>	202
Lesser Prairie Chicken: <i>Tympanuchus pallidicinctus</i>	207
Columbian Sharp-tailed Grouse: <i>Pedioecetes phasianellus columbianus</i>	209
Sage Grouse: <i>Centrocercus urophasianus</i>	211
Quails, etc.: Family Perdidae.....	212
Bob-whites and Quails: Subfamily Odontophorinae.....	212
Texas Bob-white: <i>Colinus virginianus texanus</i>	213
Arizona Scaled Quail: <i>Callipepla squamata pallida</i>	215
Gambel Quail: <i>Lophortyx gambeli gambeli</i>	218
Mearns Quail: <i>Cyrtonyx montezumae mearnsi</i>	223
Pheasants: Family Phasianidae.....	229
Ring-necked Pheasant: <i>Phasianus colchicus torquatus</i>	229
Turkeys: Family Meleagridae.....	230
Wild Turkey: <i>Meleagris gallopavo silvestris</i>	230
Merriam Turkey: <i>Meleagris gallopavo merriami</i>	231
CRANES, RAILS, ETC.: ORDER MEGALORNITHIFORMES.....	237
Cranes: Family Megalornithidae.....	237
Whooping Crane: <i>Grus americana</i>	237
Little Brown Crane: <i>Grus canadensis canadensis</i>	238
Sandhill Crane: <i>Grus mexicana</i>	239
Rails, Coots, etc.: Family Rallidae.....	240
Rails: Subfamily Rallinae.....	240
Virginia Rail: <i>Rallus virginianus</i>	241
Sora: <i>Porzana carolina</i>	242
Coots: Subfamily Fulicinae.....	243
American Coot: <i>Fulica americana</i>	243

	PAGE
SHORE-BIRDS, GULLS, AUKS, ETC.: ORDER CHARADRIIFORMES.....	247
Plovers, etc.: Family Charadriidae.....	247
Plovers: Subfamily Charadriinae.....	247
Snowy Plover: <i>Charadrius nivosus</i>	247
Mountain Plover: <i>Eupoda montana</i>	249
Killdeer: <i>Oxyechus vociferus vociferus</i>	250
American Black-bellied Plover: <i>Squatarola squatarola</i>	254
Snipes, Sandpipers, etc.: Family Scolopacidae.....	255
Snipes: Subfamily Scolopacinae.....	256
Wilson Snipe: <i>Capella delicata</i>	256
Curlews, etc.: Subfamily Numeniinae.....	258
Long-billed Curlew: <i>Numenius americanus americanus</i>	258
Canadian Curlew: <i>Numenius americanus occidentalis</i>	261
Hudsonian Curlew: <i>Numenius hudsonicus</i>	261
Eskimo Curlew: <i>Phaeopus borealis</i>	261
Upland Plover: <i>Bartramia longicauda</i>	262
Spotted Sandpiper: <i>Actitis macularia</i>	264
Solitary Sandpiper: <i>Tringa solitaria solitaria</i>	266
Western Solitary Sandpiper: <i>Tringa solitaria cinnamomea</i>	266
Western Willet: <i>Catoptrophorus semipalmatus inornatus</i>	267
Greater Yellow-legs: <i>Totanus melanoleucus</i>	268
Yellow-legs: <i>Totanus flavipes</i>	270
Sandpipers: Subfamily Calidrinae.....	271
Pectoral Sandpiper: <i>Pisobia melanotos</i>	271
White-rumped Sandpiper: <i>Pisobia fuscicollis</i>	273
Baird Sandpiper: <i>Pisobia bairdi</i>	273
Least Sandpiper: <i>Pisobia minutilla</i>	275
Long-billed Dowitcher: <i>Limnodromus griseus scolopaceus</i>	277
[Stilt Sandpiper: <i>Micropalama himantopus</i>].....	278
Western Sandpiper: <i>Ereunetes mauri</i>	278
Sanderling: <i>Crocethia alba</i>	280
Avocets and Stilts: Family Recurvirostridae.....	280
American Avocet: <i>Recurvirostra americana</i>	281
Black-necked Stilt: <i>Himantopus mexicanus</i>	283
Phalaropes: Family Phalaropodidae.....	285
Northern Phalarope: <i>Lobipes lobatus</i>	285
Wilson Phalarope: <i>Steganopus tricolor</i>	287
Gulls and Terns: Family Laridae.....	289
Gulls: Subfamily Larinae.....	289
Ring-billed Gull: <i>Larus delawarensis</i>	289
Laughing Gull: <i>Larus atricilla</i>	291
Franklin Gull: <i>Larus pipixcan</i>	291
Heermann Gull: <i>Larus heermanni</i>	292
Sabine Gull: <i>Xema sabini</i>	293
Terns: Subfamily Sterninae.....	293
Forster Tern: <i>Sterna forsteri</i>	293
American Black Tern: <i>Chlidonias nigra surinamensis</i>	294
PIGEONS, DOVES, ETC.: ORDER COLUMBIFORMES.....	296
Pigeons and Doves: Family Columbidae.....	296
Band-tailed Pigeon: <i>Columba fasciata fasciata</i>	296
Western Mourning Dove: <i>Zenaidura macroura marginella</i>	299
Western White-winged Dove: <i>Melopelia asiatica mearnsi</i>	303
Mexican Ground Dove: <i>Chamaepelia passerina pallescens</i>	305
Inca Dove: <i>Scardafella inca</i>	306
PARROTS, MACAWS, PAROQUETS, ETC.: ORDER PSITTACIFORMES.....	306
Parrots and Paroquets: Family Psittacidae.....	306
Thick-billed Parrot: <i>Rhynchopsitta pachyrhyncha</i>	306

	PAGE
CUCKOOS, ROAD-RUNNERS, ETC.: ORDER CUCULIFORMES.....	307
Cuckoos and Road-runners: Family Cuculidae.....	307
Cuckoos: Subfamily Cuculinae.....	308
California Cuckoo: <i>Coccyzus americanus occidentalis</i>	308
Road-runners: Subfamily Neomorphinae.....	309
Road-runner: <i>Geococcyx californianus</i>	309
OWLS: ORDER STRIGIFORMES.....	314
Barn Owls: Family Tytonidae.....	314
American Barn Owl: <i>Tyto alba pratincola</i>	315
Horned Owls, etc.: Family Strigidae.....	316
Mexican Screech Owl: <i>Otus asio cineraceus</i>	316
Aiken Screech Owl: <i>Otus asio aikeni</i>	318
Flammulated Screech Owl: <i>Otus flammeolus flammeolus</i>	318
Pallid Horned Owl: <i>Bubo virginianus pallescens</i>	320
Western Horned Owl: <i>Bubo virginianus occidentalis</i>	324
Rocky Mountain Pygmy Owl: <i>Glaucidium gnoma pinicola</i>	324
Elf Owl: <i>Micropallus whitneyi whitneyi</i>	326
Burrowing Owl: <i>Speotyto cunicularia hypogaea</i>	327
Arizona Spotted Owl: <i>Strix occidentalis lucida</i>	330
American Long-eared Owl: <i>Asio wilsonianus</i>	332
Short-eared Owl: <i>Asio flammeus</i>	334
Saw-whet Owl: <i>Cryptoglaux acadica acadica</i>	337
GOATSUCKERS, ETC.: ORDER CAPRIMULGIFORMES.....	339
Whip-poor-wills, Nighthawks, Poor-wills, etc.: Family Caprimulgidae....	339
Whip-poor-wills and Poor-wills: Subfamily Caprimulginae.....	339
Stephens Whip-poor-will: <i>Antrostomus vociferus arizonae</i>	339
Poor-will: <i>Phalaenoptilus nuttalli nuttalli</i>	340
Nighthawks: Subfamily Chordeilinae.....	342
Western Nighthawk: <i>Chordeiles minor henryi</i>	342
Pacific Nighthawk: <i>Chordeiles minor hesperis</i>	345
Howell Nighthawk: <i>Chordeiles minor howelli</i>	346
Texas Nighthawk: <i>Chordeiles acutipennis texensis</i>	346
SWIFTS AND HUMMINGBIRDS: ORDER MICROPODIIFORMES.....	348
Swifts: Family Micropodidae.....	348
Spine-tailed Swifts: Subfamily Chaeturinae.....	348
Northern Black Swift: <i>Nephoecetes niger borealis</i>	348
Chimney Swift: <i>Chaetura pelagica</i>	350
Typical Swifts: Subfamily Micropodinae.....	351
White-throated Swift: <i>Aeronautes saxatalis</i>	351
Hummingbirds: Family Trochilidae.....	353
Subfamily Trochilinae.....	353
Black-chinned Hummingbird: <i>Archilochus alexandri</i>	354
Costa Hummingbird: <i>Calypte costae</i>	355
Broad-tailed Hummingbird: <i>Selasphorus platycercus</i>	357
Rufous Hummingbird: <i>Selasphorus rufus</i>	362
Calliope Hummingbird: <i>Stellula calliope</i>	366
Rivoli Hummingbird: <i>Eugenes fulgens</i>	368
Broad-billed Hummingbird: <i>Cynanthus latirostris</i>	369
Arizona Blue-throated Hummingbird: <i>Lampornis clemenciae</i> <i>bessophilus</i>	370
TROGONS: ORDER TROGONIFORMES.....	372
Trogons: Family Trogonidae.....	372
[Coppery-tailed Trogon: <i>Trogonurus ambiguus</i>].....	372
KINGFISHERS, ETC.: ORDER CORACIIFORMES.....	373
Kingfishers: Family Alcedinidae.....	373

KINGFISHERS, ETC.: ORDER CORACIIFORMES—Continued.	PAGE
Subfamily Cerylinae.....	373
Belted Kingfisher: <i>Megaceryle alcyon alcyon</i>	373
[Texas Kingfisher: <i>Chloroceryle americana septentrionalis</i>].....	376
WOODPECKERS, ETC.: ORDER PICIFORMES.....	376
Woodpeckers: Family Picidae.....	376
Subfamily Picinae.....	376
Red-shafted Flicker: <i>Colaptes cafer collaris</i>	377
Northern Pileated Woodpecker: <i>Ceophloeus pileatus abieticola</i> ...	380
Gila Woodpecker: <i>Centurus uropygialis uropygialis</i>	381
Red-headed Woodpecker: <i>Melanerpes erythrocephalus</i>	383
Mearns Woodpecker: <i>Balanosphyra formicivora aculeata</i>	386
Lewis Woodpecker: <i>Asyndesmus lewisi</i>	390
Red-naped Sapsucker: <i>Sphyrapicus varius nuchalis</i>	394
Rocky Mountain Sapsucker: <i>Sphyrapicus thyroideus nataliae</i> ...	397
Rocky Mountain Hairy Woodpecker: <i>Dryobates villosus monticola</i>	400
White-breasted Woodpecker: <i>Dryobates villosus leucothorectis</i> ..	403
Chihuahua Woodpecker: <i>Dryobates villosus icastus</i>	404
Batchelder Woodpecker: <i>Dryobates pubescens homorus</i>	404
Cactus Woodpecker: <i>Dryobates scalaris cactophilus</i>	407
Arizona Woodpecker: <i>Dryobates arizonae arizonae</i>	410
Alpine Threc-toed Woodpecker: <i>Picoides americanus dorsalis</i> ...	411
PERCHING BIRDS: ORDER PASSERIFORMES.....	413
Tyrant Flycatchers: Family Tyrannidae.....	414
Kingbird: <i>Tyrannus tyrannus</i>	414
Arkansas Kingbird: <i>Tyrannus verticalis</i>	416
Cassin Kingbird: <i>Tyrannus vociferans</i>	419
Scissor-tailed Flycatcher: <i>Museivora forficata</i>	421
Arizona Crested Flycatcher: <i>Myiarchus magister magister</i>	423
Ash-throated Flycatcher: <i>Myiarchus cinerascens cinerascens</i>	424
Olivaceous Flycatcher: <i>Myiarchus lawrencei olivascens</i>	427
Sulphur-bellied Flycatcher: <i>Myiodynastes luteiventris</i>	427
Phoebe: <i>Sayornis phoebe</i>	428
Say Phoebe: <i>Sayornis sayus</i>	429
Black Phoebe: <i>Sayornis nigricans semiatra</i>	433
Western Flycatcher: <i>Empidonax difficilis difficilis</i>	434
Little Traill Flycatcher: <i>Empidonax trailli brewsteri</i>	437
Hammond Flycatcher: <i>Empidonax hammondi</i>	437
Wright Flycatcher: <i>Empidonax wrighti</i>	438
Gray Flycatcher: <i>Empidonax griseus</i>	440
Buff-breasted Flycatcher: <i>Empidonax fulvifrons pygmaeus</i>	440
Coues Flycatcher: <i>Myiochanes pertinax pallidiventris</i>	442
Western Wood Pewee: <i>Myiochanes richardsoni richardsoni</i>	443
Olive-sided Flycatcher: <i>Nuttallornis borealis</i>	445
Vermilion Flycatcher: <i>Pyrocephalus rubinus mexicanus</i>	446
Larks: Family Alaudidae.....	448
Desert Horned Lark: <i>Otocoris alpestris leucolaema</i>	448
Montezuma Horned Lark: <i>Otocoris alpestris occidentalis</i>	452
Chihuahua Horned Lark: <i>Otocoris alpestris aphrasta</i>	452
Saskatchewan Horned Lark: <i>Otocoris alpestris enthyimia</i>	452
Swallows: Family Hirundinidae.....	453
Northern Violet-green Swallow: <i>Tachycineta thalassina lepida</i>	453
Tree Swallow: <i>Iridoprocne bicolor</i>	456
Bank Swallow: <i>Riparia riparia riparia</i>	457
Rough-winged Swallow: <i>Stelgidopteryx serripennis</i>	458
American Barn Swallow: <i>Hirundo erythrogaster</i>	459
Cliff Swallow: <i>Petrochelidon albifrons albifrons</i>	462
Lesser Cliff Swallow: <i>Petrochelidon albifrons tachina</i>	465

CONTENTS

xv

PERCHING BIRDS: ORDER PASSERIFORMES—Continued.	PAGE
Mexican Cliff Swallow: <i>Petrochelidon albifrons melanogastra</i>	465
Purple Martin: <i>Progne subis subis</i>	467
Magpies, Jays, Crows, etc.: Family <i>Corvidae</i>	469
Magpies and Jays: Subfamily <i>Garrulinae</i>	470
Rocky Mountain Canada Jay: <i>Perisoreus canadensis capitalis</i> ...	470
Northern Blue Jay: <i>Cyanocitta cristata bromia</i>	473
Long-crested Jay: <i>Cyanocitta stelleri diademata</i>	474
Woodhouse Jay: <i>Aphelocoma californica woodhousei</i>	476
Arizona Jay: <i>Aphelocoma sieberi arizonae</i>	479
American Magpie: <i>Pica pica hudsonia</i>	481
Ravens, Crows, etc.: Subfamily <i>Corvinae</i>	487
American Raven: <i>Corvus corax sinuatus</i>	487
White-necked Raven: <i>Corvus cryptoleucus</i>	489
Western Crow: <i>Corvus brachyrhynchos hesperis</i>	494
Pinyon Jay: <i>Cyanocephalus cyanocephalus</i>	497
Clark Nutcracker: <i>Nucifraga columbiana</i>	501
Titmice, Chickadees, etc.: Family <i>Paridae</i>	505
Titmice and Chickadees: Subfamily <i>Parinae</i>	506
Long-tailed Chickadee: <i>Penthestes atricapillus septentrionalis</i> ...	506
Mexican Chickadee: <i>Penthestes sclateri</i>	508
Mountain Chickadee: <i>Penthestes gambeli gambeli</i>	508
Gray Titmouse: <i>Baeolophus inornatus griseus</i>	510
Bridled Titmouse: <i>Baeolophus wollweberi annexus</i>	513
Verdins: Subfamily <i>Remizinae</i>	514
Verdin: <i>Auriparus flaviceps flaviceps</i>	514
Bush-Tits: Subfamily <i>Psaltiriparinae</i>	517
Lead-colored Bush-Tit: <i>Psaltiriparus plumbeus</i>	517
Lloyd Bush-Tit: <i>Psaltiriparus melanotis lloydi</i>	520
Nuthatches: Family <i>Sittidae</i>	520
Subfamily <i>Sittinae</i>	520
Rocky Mountain Nuthatch: <i>Sitta carolinensis nelsoni</i>	521
Red-breasted Nuthatch: <i>Sitta canadensis</i>	523
Pygmy Nuthatch: <i>Sitta pygmaea pygmaea</i>	524
Creepers: Family <i>Certhiidae</i>	527
Subfamily <i>Certhiinae</i>	527
Mexican Creeper: <i>Certhia familiaris albescens</i>	527
Rocky Mountain Creeper: <i>Certhia familiaris montana</i>	528
Dippers: Family <i>Cinclidae</i>	531
American Dipper: <i>Cinclus mexicanus unicolor</i>	531
Wrens: Family <i>Troglodytidae</i>	535
Western House Wren: <i>Troglodytes aedon parkmani</i>	535
Western Winter Wren: <i>Nannus hiemalis pacificus</i>	537
[Carolina Wren: <i>Thryothorus ludovicianus ludovicianus</i>].....	538
Baird Bewick Wren: <i>Thryomanes bewicki eremophilus</i>	538
Cactus Wren: <i>Heleodytes brunneicapillus couesi</i>	540
Western Marsh Wren: <i>Telmatodytes palustris plesius</i>	544
Canyon Wren: <i>Catherpes mexicanus conspersus</i>	545
Rock Wren: <i>Salpinctes obsoletus obsoletus</i>	547
Thrashers, Mockingbirds, etc.: Family <i>Mimidae</i>	550
Western Mockingbird: <i>Mimus polyglottos leucopterus</i>	551
Catbird: <i>Dumetella carolinensis</i>	554
Curve-billed Thrasher: <i>Toxostoma curvirostre curvirostre</i>	555
Bendire Thrasher: <i>Toxostoma bendirei</i>	557
Crissal Thrasher: <i>Toxostoma crissale</i>	558
Sage Thrasher: <i>Oreoscoptes montanus</i>	560
Thrushes, Solitaires, Bluebirds, etc.: Family <i>Turdidae</i>	563
Western Robin: <i>Turdus migratorius propinquus</i>	563
Northern Varied Thrush: <i>Ixoreus naevius meruloides</i>	568
Willow Thrush: <i>Hylocichla fuscescens salicicola</i>	568

PERCHING BIRDS: ORDER PASSERIFORMES—Continued.	PAGE
Russet-backed Thrush: <i>Hylocichla ustulata ustulata</i>	569
Alaska Hermit Thrush: <i>Hylocichla guttata guttata</i>	570
Audubon Hermit Thrush: <i>Hylocichla guttata auduboni</i>	571
Dwarf Hermit Thrush: <i>Hylocichla guttata nanus</i>	572
Sierra Hermit Thrush: <i>Hylocichla guttata sequoiensis</i>	573
[Bluebird: <i>Sialia sialis sialis</i>].....	573
Chestnut-backed Bluebird: <i>Sialia mexicana bairdi</i>	573
Mountain Bluebird: <i>Sialia currucoides</i>	576
Townsend Solitaire: <i>Myadestes townsendi</i>	579
Kinglets, Gnatcatchers, etc.: Family Sylviidae.....	583
Gnatcatchers: Subfamily Polioptilinae.....	583
Western Gnatcatcher: <i>Polioptila caerulea obscura</i>	583
Plumbeous Gnatcatcher: <i>Polioptila plumbea plumbea</i>	584
Kinglets: Subfamily Regulinae.....	585
Western Golden-crowned Kinglet: <i>Regulus satrapa olivaceus</i>	585
Ashy Ruby-crowned Kinglet: <i>Corthylio calendula cinerascens</i>	586
Pipits, etc.: Family Motacillidae.....	588
American Pipit: <i>Anthus spinoletta rubescens</i>	588
Waxwings: Family Bombycillidae.....	591
Bohemian Waxwing: <i>Bombycilla garrula pallidiceps</i>	591
Cedar Waxwing: <i>Bombycilla cedrorum</i>	592
Silky Flycatchers: Family Ptilogonatidae.....	594
Phainopepla: <i>Phainopepla nitens</i>	594
Shrikes: Family Laniidae.....	595
Subfamily Laniinae.....	595
Northern Shrike: <i>Lanius borealis</i>	596
White-rumped Shrike: <i>Lanius ludovicianus excubitorides</i>	597
Vireos: Family Vireonidae.....	599
Subfamily Vireoninae.....	599
Subgenus Vireo.....	600
Stephens Vireo: <i>Vireo huttoni stephensi</i>	600
Gray Vireo: <i>Vireo vicinior</i>	601
Arizona Least Vireo: <i>Vireo belli arizonae</i>	601
Subgenus Lanivireo.....	602
Cassin Vireo: <i>Vireo solitarius cassinii</i>	602
Plumbeous Vireo: <i>Vireo solitarius plumbeus</i>	603
Subgenus Vireosylva.....	605
Western Warbling Vireo: <i>Vireo gilva swainsoni</i>	605
Wood Warblers: Family Mniotiltidae.....	608
[Golden-winged Warbler: <i>Vermivora chrysoptera</i>].....	608
Lucy Warbler: <i>Vermivora luciae</i>	609
Virginia Warbler: <i>Vermivora virginiae</i>	609
Rocky Mountain Orange-crowned Warbler: <i>Vermivora celata</i> <i>orestera</i>	611
[Olive Warbler: <i>Peucedramus olivaceus</i>].....	612
Western Yellow Warbler: <i>Dendroica aestiva morcomi</i>	613
Sonora Yellow Warbler: <i>Dendroica aestiva sonorana</i>	614
Alaska Yellow Warbler: <i>Dendroica aestiva rubiginosa</i>	615
Black-throated Blue Warbler: <i>Dendroica caerulescens caerulescens</i>	615
Hoover Warbler: <i>Dendroica coronata hooveri</i>	616
Audubon Warbler: <i>Dendroica auduboni auduboni</i>	616
Cerulean Warbler: <i>Dendroica cerulea</i>	619
Black-poll Warbler: <i>Dendroica striata</i>	620
Blackburnian Warbler: <i>Dendroica fusca</i>	620
Grace Warbler: <i>Dendroica graciae</i>	621
Black-throated Gray Warbler: <i>Dendroica nigrescens</i>	622
Townsend Warbler: <i>Dendroica townsendi</i>	624
[Ovenbird: <i>Seiurus aurocapillus</i>].....	625

PERCHING BIRDS: ORDER PASSERIFORMES—Continued	PAGE
Grinnel Water-Thrush: <i>Seiurus noveboracensis notabilis</i>	626
Macgillivray Warbler: <i>Oporornis tolmiei</i>	626
Western Yellow-throat: <i>Geothlypis trichas occidentalis</i>	628
Long-tailed Chat: <i>Icteria virens longicauda</i>	629
Red-faced Warbler: <i>Cardellina rubrifrons</i>	630
Pileolated Warbler: <i>Wilsonia pusilla pileolata</i>	631
Golden Pileolated Warbler: <i>Wilsonia pusilla chryseola</i>	633
American Redstart: <i>Setophaga ruticilla</i>	633
Painted Redstart: <i>Setophaga picta</i>	634
Meadowlarks, Blackbirds, Orioles, etc.: Family Icteridae	637
[Bobolink: <i>Dolichonyx oryzivorus</i>]	637
Rio Grande Meadowlark: <i>Sturnella magna hoopesi</i>	638
Western Meadowlark: <i>Sturnella neglecta neglecta</i>	639
Yellow-headed Blackbird: <i>Xanthocephalus xanthocephalus</i>	642
Sonora Red-wing: <i>Agelaius phoeniceus sonoriensis</i>	646
Thick-billed Red-wing: <i>Agelaius phoeniceus fortis</i>	647
Nevada Red-wing: <i>Agelaius phoeniceus nevadensis</i>	647
Scott Oriole: <i>Icterus parisorum</i>	649
Arizona Hooded Oriole: <i>Icterus cucullatus nelsoni</i>	652
Orchard Oriole: <i>Icterus spurius</i>	653
Bullock Oriole: <i>Icterus bullocki bullocki</i>	654
Brewer Blackbird: <i>Euphagus cyanocephalus cyanocephalus</i>	656
Great-tailed Grackle: <i>Megaquiscalus major macrourus</i>	658
Cowbird: <i>Molothrus ater ater</i>	659
[Sagebrush Cowbird: <i>Molothrus ater artemisiae</i>]	662
Dwarf Cowbird: <i>Molothrus ater obscurus</i>	663
Tanagers: Family Thraupidae	663
Louisiana or Western Tanager: <i>Piranga ludoviciana</i>	664
Arizona Hepatic Tanager: <i>Piranga hepatica oreophasma</i>	666
Cooper Summer Tanager: <i>Piranga rubra cooperi</i>	668
Finches, Sparrows, Buntings, etc.: Family Fringillidae	670
Grosbeaks, etc.: Subfamily Richmondinae	670
Arizona Cardinal: <i>Richmondia cardinalis superbus</i>	670
[Gray-tailed Cardinal: <i>Richmondia canicaudus</i>]	671
Arizona Pyrrhuloxia: <i>Pyrrhuloxia sinuata sinuata</i>	672
Texas Pyrrhuloxia: <i>Pyrrhuloxia sinuata texana</i>	673
Rose-breasted Grosbeak: <i>Hedymeles ludovicianus</i>	673
Rocky Mountain Black-headed Grosbeak: <i>Hedymeles melanocephalus papago</i>	674
Arizona Blue Grosbeak: <i>Guiraca caerulea interfusa</i>	677
Lazuli Bunting: <i>Passerina amoena</i>	678
Painted Bunting: <i>Passerina ciris</i>	680
Dickcissel: <i>Spiza americana</i>	680
Old-World Sparrows: Subfamily Passerinae	681
English Sparrow: <i>Passer domesticus</i>	681
Finches, etc.: Subfamily Carduelinae	683
Rocky Mountain Evening Grosbeak: <i>Hesperiphona vespertina warreni</i>	683
Cassin Purple Finch: <i>Carpodacus cassinii</i>	688
House Finch: <i>Carpodacus mexicanus frontalis</i>	689
Rocky Mountain Pine Grosbeak: <i>Pinicola enucleator montana</i>	694
Gray-crowned Rosy Finch: <i>Leucosticte tephrocotis tephrocotis</i>	695
Hepburn Rosy Finch: <i>Leucosticte tephrocotis littoralis</i>	697
Black Rosy Finch: <i>Leucosticte atrata</i>	697
Brown-capped Rosy Finch: <i>Leucosticte australis</i>	698
Pine Siskin: <i>Spinus pinus pinus</i>	699
Pale Goldfinch: <i>Astragalinus tristis pallidus</i>	702
Arkansas Goldfinch: <i>Astragalinus psaltria psaltria</i>	703

PERCHING BIRDS: ORDER PASSERIFORMES—Continued	PAGE
Green-backed Goldfinch: <i>Astragalinus psaltria hesperophilus</i>	704
Lawrence Goldfinch: <i>Astragalinus lawrencei</i>	705
Bendire Crossbill: <i>Loxia curvirostra bendirei</i>	706
Mexican Crossbill: <i>Loxia curvirostra stricklandi</i>	707
Towhees, Sparrows, Buntings, etc.: Subfamily Emberizinae.....	708
Green-tailed Towhee: <i>Oberholseria chlorura</i>	708
Arctic Towhee: <i>Pipilo maculatus arcticus</i>	712
Spurred Towhee: <i>Pipilo maculatus montanus</i>	712
Canyon Towhee: <i>Pipilo fuscus mesoleucus</i>	714
Abert Towhee: <i>Pipilo aberti</i>	718
Lark Bunting: <i>Calamospiza melanocorys</i>	719
Nevada Savannah Sparrow: <i>Passerculus sandwichensis nevadensis</i>	721
Western Grasshopper Sparrow: <i>Ammodramus savannarum</i>	
<i>bimaculatus</i>	722
Baird Sparrow: <i>Ammodramus bairdi</i>	723
Western Vesper Sparrow: <i>Poocetes gramineus confinis</i>	724
Western Lark Sparrow: <i>Chondestes grammacus strigatus</i>	727
[Slate-colored Fox Sparrow: <i>Passerella iliaca schistacea</i>].....	729
Scott Sparrow: <i>Aimophila ruficeps scotti</i>	730
Cassin Sparrow: <i>Peucaea cassini</i>	731
Desert Black-throated Sparrow: <i>Amphispiza bilineata deserticola</i>	732
Sage Sparrow: <i>Amphispiza nevadensis nevadensis</i>	734
White-winged Junco: <i>Junco aikenii</i>	735
Slate-colored Junco: <i>Junco hyemalis hyemalis</i>	736
Shufeldt Junco: <i>Junco oreganus shufeldti</i>	737
Montana Junco: <i>Junco oreganus montanus</i>	738
Pink-sided Junco: <i>Junco mearnsi</i>	739
Arizona Junco: <i>Junco phaeonotus palliatus</i>	740
Red-backed Junco: <i>Junco dorsalis</i>	740
Gray-headed Junco: <i>Junco caniceps</i>	742
Western Tree Sparrow: <i>Spizella monticola ochracea</i>	743
Western Chipping Sparrow: <i>Spizella passerina arizonae</i>	745
Clay-colored Sparrow: <i>Spizella pallida</i>	747
Brewer Sparrow: <i>Spizella breweri</i>	747
Worthen Sparrow: <i>Spizella wortheni</i>	749
Black-chinned Sparrow: <i>Spizella atrogularis</i>	750
Harris Sparrow: <i>Zonotrichia querula</i>	751
White-crowned Sparrow: <i>Zonotrichia leucophrys</i>	752
Gambel Sparrow: <i>Zonotrichia gambeli</i>	755
White-throated Sparrow: <i>Zonotrichia albicollis</i>	756
Rocky Mountain Song Sparrow: <i>Melospiza melodia fallax</i>	756
Merrill Song Sparrow: <i>Melospiza melodia merrilli</i>	758
Lincoln Sparrow: <i>Melospiza lincolni lincolni</i>	758
McCown Longspur: <i>Rhyncophanes mccowni</i>	760
Chestnut-collared Longspur: <i>Calcarius ornatus</i>	762
LITERATURE CITED.....	763
Periodicals.....	793
Abbreviations.....	794
INDEX.....	795

LIST OF ILLUSTRATIONS ¹

PLATES

[Colored plates in **bold-face** type]

PLATE	FACING PAGE
1. Painted Redstart and Red-faced Warbler. Allan Brooks.....	Frontispiece
2. Map of Life Zones in New Mexico. Vernon Bailey.....	6
3. Eared Grebe. L. A. Fuertes.....	76
4. Treganza Herons. Photographed from mounted group in Colorado Museum.....	88
5. Snowy Egret.....	92
6. Black-crowned Night Heron. L. A. Fuertes.....	94
7. American Bittern. Photographed by S. S. Stansell.....	96
8. Canada Geese. Photographed from mounted group in Colorado Museum.....	106
9. Soaring Vultures, Hawks, and Eagles (Turkey Vulture, Western Goshawk, Sharp-shinned, Cooper, Western Redtail, Zone-tailed, Swainson, and American Rough-legged Hawks, Ferruginous Rough-leg, Harris Hawk, Mexican Goshawk, Mexican Black Hawk, Golden Eagle, Bald Eagle, Marsh Hawk, Osprey, Prairie Falcon, Duck Hawk, Aplomado Falcon, Pigeon Hawk, and Desert Sparrow Hawk. Allan Brooks.....	150
10. Mainly Injurious Hawks (Western Goshawk, Sharp-shinned and Cooper Hawks). Allan Brooks.....	156
11. Mainly Beneficial Hawks (Western Redtail, Swainson Hawk, Ferruginous Rough-leg, and Desert Sparrow Hawk). Allan Brooks.....	162
12. Ferruginous Rough-legs. Photographed from mounted group in Colorado Museum.....	172
13. Golden Eagles. Photographed from mounted group in Colorado Museum..	170
14. Bald Eagle. Robert Ridgway.....	186
15. Marsh Hawks. L. A. Fuertes.....	182
16. Prairie Falcon. L. A. Fuertes.....	188
17. Dusky Grouse. Allan Brooks.....	196
18. Arizona Scaled Quail. L. A. Fuertes.....	216
19. Gambel Quail. Allan Brooks.....	218
20. Mearns Quail. L. A. Fuertes.....	226
21. Merriam Turkey. Photographed from mounted group in Colorado Museum.....	232
22. Sandhill Cranes. Photographed from mounted group in Colorado Museum.....	240
23. American Coot. Photographed by H. H. Pittman.....	244
24. Killdeer. L. A. Fuertes.....	250
25. Long-billed Curlew. L. A. Fuertes.....	258
26. Upland Plover. L. A. Fuertes.....	262
27. Greater Yellow-legs. L. A. Fuertes.....	268
28. Black-necked Stilts. L. A. Fuertes.....	284
29. Wilson Phalaropes. L. A. Fuertes.....	288
30. Ring-billed Gull. L. A. Fuertes.....	290
31. Band-tailed Pigeon, Western Mourning Dove, and Western White-winged Dove. Allan Brooks.....	296
32. Road-runners. Photographed from mounted group in Colorado Museum..	312
33. Screech Owl. Photographed by R. B. Rockwell.....	316
34. Burrowing Owl. Allan Brooks.....	328
35. Poor-will. L. A. Fuertes.....	340
36. Hummingbirds (Black-chinned, Broad-tailed, and Rufous). Allan Brooks.....	354
37. Red-shafted Flickers, young. Photographed by R. B. Rockwell.....	378

¹ In cases where no illustration of the New Mexico species or subspecies has been available, a previously published cut of a closely related form, essentially the same in general appearance has been used, its specific or subspecific name being given in parentheses in the legend under the illustration.

PLATE	FACING PAGE
38. Woodpeckers (Red-shafted Flicker, Gila, Red-headed, Lewis, Hairy, and Arizona Woodpeckers, and Rocky Mountain Sapsuckers). Allan Brooks.....	382
39. California Woodpeckers.....	386
40. Kingbird. L. A. Fuertes.....	414
41. Arkansas and Cassin Kingbirds. L. A. Fuertes.....	416
42. Ash-throated Flycatcher. L. A. Fuertes.....	424
43. Black Phoebe. L. A. Fuertes.....	434
44. Vermilion Flycatcher. Allan Brooks.....	446
45. Horned Larks. L. A. Fuertes.....	448
46. Northern Violet-green Swallow. Allan Brooks.....	454
47. Long-crested Jay. L. A. Fuertes.....	474
48. Woodhouse Jay. L. A. Fuertes.....	476
49. American Magpies. L. A. Fuertes.....	482
50. Crow. E. R. Kalmbach.....	494
51. Pinyon Jay. Allan Brooks.....	498
52. Gray Titmouse. L. A. Fuertes.....	510
53. Verdin. Allan Brooks.....	514
54. Pygmy Nuthatches. L. A. Fuertes.....	524
55. Water-Ouzel. Photographed by Mrs. C. F. Bicknell.....	532
56. Water-Ouzel Nest. Photographed by H. W. Nash.....	534
57. Cactus Wren. L. A. Fuertes.....	542
58. Canyon Wren. L. A. Fuertes.....	546
59. Rock Wren. L. A. Fuertes.....	548
60. Elf Owl and Curve-billed and Crissal Thrashers. Allan Brooks.....	556
61. Sage Thrasher. L. A. Fuertes.....	560
62. Say Phoebe, Chestnut-backed Bluebird, Arizona Blue Grosbeak, and Arkansas and Green-backed Goldfinches. Allan Brooks.....	574
63. Western Golden and Ashy Ruby-crowned Kinglets, Rocky Mountain Evening Grosbeak, and Mexican Crossbills. Allan Brooks.....	586
64. Warblers (Virginia, Rocky Mountain Orange-crowned, Sonora Yellow, and Grace Warblers, Grinnell Water Thrush, and Long-tailed Chat). Allan Brooks.....	608
65. Pileolated Warbler. L. A. Fuertes.....	632
66. Western Meadowlark. L. A. Fuertes.....	640
67. Yellow-headed Blackbird. L. A. Fuertes.....	644
68. Red-winged Blackbird. L. A. Fuertes.....	646
69. Scott Oriole. Allan Brooks.....	650
70. Bullock Oriole. L. A. Fuertes.....	654
71. Tanagers (Louisiana or Western, Arizona Hepatic, and Cooper Summer Tanagers). Allan Brooks.....	664
72. Arizona Pyrrhuloxia. Allan Brooks.....	672
73. Rocky Mountain Black-headed Grosbeak. Photographed by H. W. Nash.....	676
74. Lazuli and Painted Buntings. Allan Brooks.....	680
75. Nest and Eggs of Rocky Mountain Evening Grosbeak.....	684
76. House Finch. Allan Brooks.....	690
77. Lark Bunting. L. A. Fuertes.....	720
78. Western Lark Sparrow. L. A. Fuertes.....	728
79. Green-tailed and Canyon Towhees, Shufeldt and Gray-headed Juncos. Allan Brooks.....	738

LIST OF ILLUSTRATIONS

xxi

FIGURES IN THE TEXT

FIGURE	PAGE
1. Loons.....	73
2. Grebe, foot.....	75
3. Eared Grebe, nest.....	76
4. Pied-billed Grebe and young.....	81
5. Pelican, head.....	83
6. Cormorant, head.....	84
7. White-faced Glossy Ibis, head.....	100
8. White-fronted Goose, head.....	107
9. Mallard, head.....	110
10. Baldpate, head.....	117
11. Green-winged Teal, head.....	122
12. Blue-winged Teal, head.....	124
13. Cinnamon Teal, head.....	126
14. Redheads.....	132
15. Redhead, nest and eggs.....	133
16. Canvasback, head.....	134
17. American Scaup Duck, head.....	136
18. American Golden-eye, head.....	139
19. Buffle-head, head.....	141
20. Ruddy Duck, head.....	143
21. Hooded Merganser, head.....	146
22. Red-breasted Merganser, head.....	149
23. Red-breasted Merganser, downy young.....	149
24. Turkey Vulture, head.....	151
25. Turkey Vulture, foot.....	151
26. Zone-tailed Hawk.....	165
27. Swainson Hawk, nestlings.....	168
28. Osprey.....	184
29. Caracara, head.....	186
30. Duck Hawk.....	189
31. Pigeon Hawk.....	192
32. Ptarmigan, foot.....	202
33. Southern White-tailed Ptarmigan in winter plumage.....	202
34. Southern White-tailed Ptarmigan in summer plumage.....	203
35. Prairie Sharp-tailed Grouse.....	209
36. Texas Bob-white, skin.....	213
37. Mearns Quail.....	224
38. Ring-necked Pheasant.....	229
39. Virginia Rail, head.....	241
40. Sora Rail, head.....	242
41. American Coot, foot.....	243
42. Black-bellied Plover.....	254
43. Wilson Snipe, head.....	256
44. Long-billed Dowitcher, skin.....	277
45. Avocet, head.....	280
46. American Black Tern.....	294
47. Western Mourning Dove, tail.....	300
48. Cuckoo.....	307
49. Road-runner.....	310
50. Barn Owl.....	314
51. Screech Owls, young.....	319
52. Pallid Horned Owl, head.....	321
53. Arizona-Spotted Owl.....	331
54. Long-eared Owl.....	333
55. Short-eared Owl.....	335
56. Saw-whet Owl, head.....	338
57. Nighthawk, foot.....	342

FIGURE	PAGE
58. Nighthawk.....	343
59. Texas Nighthawk, wing.....	347
60. White-throated Swift, skin.....	351
61. Broad-tailed Hummingbird, tail of male.....	357
62. Broad-tailed Hummingbird, tail of female.....	357
63. Broad-tailed Hummingbird, young.....	358
64. Calliope Hummingbird.....	366
65. Blue-throated Hummingbird.....	371
66. Kingfisher, foot.....	373
67. Kingfisher.....	373
68. Woodpecker, tongue.....	376
69. Red-naped Sapsucker, skin.....	395
70. Hairy Woodpecker, foot.....	400
71. Cactus Woodpecker.....	407
72. Three-toed Woodpecker, foot.....	411
73. Alpine Three-toed Woodpeckers, young.....	411
74. Scissor-tailed Flycatcher.....	422
75. Say Phoebe, nest and eggs.....	430
76. Tree Swallow, head.....	456
77. Bank Swallow, head.....	457
78. Rough-winged Swallow, head.....	459
79. Barn Swallow.....	460
80. Cliff Swallow, head.....	462
81. Purple Martin and young Cliff Swallows.....	463
82. Rocky Mountain Canada Jay.....	470
83. Blue Jay.....	473
84. American Magpie, young.....	482
85. White-necked Raven, nest.....	490
86. Nutcracker.....	501
87. Chickadee.....	507
88. Mountain Chickadee.....	509
89. Bridled Titmouse, head.....	513
90. Bush-tits and nest.....	517
91. Nuthatch, head.....	520
92. Rocky Mountain Nuthatches, young.....	521
93. Red-breasted Nuthatch, head.....	524
94. Brown Creeper.....	528
95. House Wren.....	536
96. Cactus Wren, nest.....	541
97. Mockingbird.....	551
98. Robin.....	564
99. Russet-backed Thrush.....	570
100. Mountain Bluebird.....	577
101. Gnatcatcher.....	583
102. Pipit.....	589
103. Cedar Waxwing.....	592
104. Phainopepla.....	594
105. Shrike.....	595
106. Cassin Vireo, head.....	602
107. Audubon Warbler.....	617
108. Black-throated Gray Warbler, head.....	623
109. Townsend Warbler, head.....	624
110. Macgillivray Warbler, head.....	627
111. Western Yellow-throat, head.....	628
112. Yellow-headed Blackbird, nest and eggs.....	643
113. Arizona Hooded Oriole, head.....	652
114. Black-headed Grosbeak.....	674
115. Dickcissel, head.....	681

LIST OF ILLUSTRATIONS

xxiii

FIGURE	PAGE
116. English Sparrow	682
117. Cassin Purple Finch, head.....	688
118. Gray-crowned Rosy Finch, head.....	696
119. Pine Siskin.....	700
120. Arctic Towhee, skin.....	712
121. Spurred Towhee, skin.....	712
122. Savannah Sparrow, skin.....	721
123. Baird Sparrow, skin.....	724
124. Vesper Sparrow, tail.....	725
125. Black-throated Sparrow, head	733
126. Sage Sparrow, head.....	734
127. Western Tree Sparrow.....	744
128. Western Chipping Sparrow, head.....	745
129. Brewer Sparrow, head.....	748
130. Worthen Sparrow, head.....	749
131. Harris Sparrow.....	751
132. White-crowned Sparrow.....	752
133. Gambel Sparrow, head.....	755
134. Song Sparrow.....	757
135. McCown Longspur, skin.....	760
136. Chestnut-collared Longspur, foot.....	762

MAPS

Life Zone Map (Plate 2).....	Facing page 6
------------------------------	---------------

MAP

1. Routes and collecting localities of Biological Survey parties.....	14
2. Treganza Blue Heron.....	88
3. Dusky Grouse.....	198
4. Southern White-tailed Ptarmigan.....	204
5. Arizona Scaled Quail.....	216
6. Gambel Quail.....	220
7. Mearns Quail.....	225
8. Merriam Turkey.....	233
9. Coot.....	244
10. Killdeer.....	252
11. Western Mourning Dove.....	301
12. Road-runner	311
13. Burrowing Owl.....	328
14. Broad-tailed Hummingbird.....	359
15. Gila Woodpecker.....	382
16. Red-headed Woodpecker.....	385
17. Mearns Woodpecker.....	388
18. Lewis Woodpecker.....	391
19. Red-naped Sapsucker.....	396
20. Rocky Mountain Sapsucker.....	398
21. Hairy Woodpeckers	401
22. Batchelder Woodpecker.....	405
23. Cactus Woodpecker.....	408
24. Alpine Three-toed Woodpecker.....	412
25. Arkansas Kingbird.....	417
26. Ash-throated Flycatcher.....	425
27. Western Flycatcher.....	436
28. Buff-breasted Flycatcher.....	441
29. Horned Larks.....	449
30. Cliff Swallows.....	464
31. Purple Martin.....	468

MAP	PAGE
32. Rocky Mountain Canada Jay.....	471
33. Long-crested Jay.....	475
34. Woodhouse Jay.....	478
35. Arizona Jay.....	479
36. American Magpie.....	483
37. White-necked Raven.....	491
38. Western Crow.....	495
39. Gray Titmouse.....	512
40. Bridled Titmouse.....	514
41. Verdin.....	516
42. Lead-colored Bush-tit.....	519
43. Pygmy Nuthatch.....	525
44. Brown Creepers.....	529
45. Baird Bewick Wren.....	539
46. Canyon Wren.....	546
47. Rock Wren.....	549
48. Western Mockingbird.....	552
49. Curve-billed Thrasher.....	556
50. Crissal Thrasher.....	559
51. Sage Thrasher.....	562
52. Mountain Bluebird.....	578
53. Western Warbling Vireo.....	606
54. Rio Grande Meadowlark.....	638
55. Red-winged Blackbirds.....	646
56. Scott Oriole.....	650
57. Bullock Oriole.....	655
58. Cowbirds.....	661
59. Arizona Hepatic Tanager.....	667
60. Western Lark Sparrow.....	728

DIAGRAMS

Topography of bird and measurement of bill and tarsus.....	72
Nine-inch scale.....	Inside back cover

INTRODUCTION

By FLORENCE MERRIAM BAILEY

NEW MEXICO has the distinction of being the first State in the Union from which bird notes were recorded by white men. These notes refer to birds seen on the Coronado Expedition in 1540, three hundred and eighty-eight years ago, eighty-two years before the first recorded birds were seen in New England (see Thomas Morton's *New English Canaan*, printed in 1637).

The actual study of the birds of New Mexico has attracted naturalists from the days of the early explorations that crossed parts of New Mexico, the first records being made on the Long Expedition to the Rocky Mountains in 1820. The field notes now brought together include the published records of the early surveys, other printed reports and notes, and migration notes from various observers, together with the much greater mass of unpublished records of the Bureau of Biological Survey, U. S. Department of Agriculture, from 1889 down to the year 1928.

ACKNOWLEDGMENTS

The systematic survey of New Mexico was definitely undertaken in 1903, under the direction of Dr. C. Hart Merriam, then Chief of the Biological Survey; and Mr. Vernon Bailey, who had just completed a survey of the adjoining State of Texas,¹ was put in charge of the work. When the field investigations carried on by Mr. Bailey and a corps of assistants were finally completed, while he was occupied in preparing the reports on the life and crop zones,² and on the mammals of the State, Prof. Wells Woodbridge Cooke was asked to assemble the material for the bird report.

In performing this task, in order to enable future students the more easily to locate the work previously done in the State, Professor Cooke, with characteristic painstaking labor, compiled a chronological list of all reliable observers, from 1820 to 1916, with their itineraries and published reports, supplemented by a dated, minute list of localities visited, many of them not on the maps; while, for the benefit of local students, he compiled State lists showing the detailed distribution of each of the three hundred and forty-nine well-authenticated species and subspecies and the thirteen additional hypothetical ones which he credited to the

¹ Bailey, Vernon, *Biological Survey of Texas*. N. Amer. Fauna No. 25, Biol. Surv., U. S. Dept. Agr., 1905.

² Bailey, Vernon, *Life Zones and Crop Zones of New Mexico*. N. Amer. Fauna No. 35, Biol. Surv., U. S. Dept. Agr., 1913.

State. Thirty-two species or subspecies have been added since the death of Professor Cooke, bringing the total number up to three hundred and eighty-one, while there is a hypothetical list of fifteen additional ones that may have occurred or are likely to occur in the State. Professor Cooke also planned for numerous maps, showing the distribution of individual species, to be prepared from data in the Biological Survey, together with a route map (see page 14), showing the field trips made by wagon or pack outfit by members of the Biological Survey when engaged in their extensive study of the birds and mammals of New Mexico.

This work, of great value to the student, had been nearly finished before the death of Professor Cooke on March 30, 1916. Soon after this, Dr. E. W. Nelson, then Chief of the Biological Survey, decided to change the character and scope of the report, incorporating Professor Cooke's material in a comprehensive book of general use and interest on the birds of the State. At Doctor Nelson's request, I have prepared the book, bringing down Professor Cooke's lists of itineraries and localities, and his State distributional records from 1916 to 1928, and adding a statement of complete range, descriptions of the birds, their nests, eggs, and food, together with accounts of their general habits, references to some of the more important or interesting papers concerning them, a bibliography of literature cited, a list of the most notable periodicals treating of birds, a list of abbreviations, and a glossary of the few necessary technical terms used, in addition to introductory material on the value and zonal distribution of birds in the State, refuges and conservation organizations, fossil birds found, birds first described, and collections made in the State.

In the process of completing the State records compiled by Professor Cooke, new material, worked up or recorded since the date of his death, has not only resulted in the inclusion of additional species, but in certain instances has so altered his conclusions that his paragraphs have been partially rewritten, in some of which cases his name has been omitted as authority for the paragraphs. In many other cases, additional notes have merely amplified his statements and, if referring to a period prior to his death, have been inserted without comment; if dated subsequent to his death, they have been inserted in the proper place in the paragraph credited to him, but inclosed in brackets. In these State records, to avoid the repetition of the name of the authority for records of two or more localities, the name has been given only after the last.

In addition to the distributions worked out by Professor Cooke for local students, under the heading "State records," I have added for the benefit of the more general student and also the casual reader, the brief

paragraphs entitled "Range."¹ As these Ranges are subordinated to the State Records, they are stated arbitrarily, from north to south (roughly in an ellipse from northwest to northeast and south from southeast to southwest) without regard to centers of distribution.

The condensed descriptions of birds—in which the field characters and the most important marks are italicized to help the beginner and the more detailed characters given for the benefit of the student²—are taken in part from my Handbook of Western Birds, Chapman's Handbook of Birds of Eastern North America, Coues's Key to North American Birds, Ridgway's Birds of North and Middle America, Bent's Life Histories of North American Birds, Baird, Brewer, and Ridgway's History of North American Birds, Chapman's Notes on the Plumages of North American Birds published in Bird-Lore (beginning in 1910 and still continuing), Grinnell, Bryant, and Storer's Game Birds of California; Forbush's Birds of Massachusetts, Vols. 1 and 2, Taverner's Birds of Western Canada, Dwight's Gulls of the World, and Hoffman's Birds of the Pacific States.³

For those interested in the vitally important question of the economic status of birds, I have introduced paragraphs entitled "Food," derived mainly from the publications and files of the Biological Survey and Henderson's Practical Value of Birds.

Descriptions of nests and eggs have been taken from the Handbook of Western Birds, Bent's Life Histories of North American Birds, Grinnell, Bryant, and Storer's Game Birds of California, Coues's Key to North American Birds (Fifth Edition), and from the files of the Auk, the Condor, and the Oologist since the publication of the Handbook in 1902.

The life-history material, or notes on the general habits of the birds, when adequate local data have been lacking, has been added from the published records of observers in other States; but otherwise has been

¹ Where detailed information regarding range is desired, consult Bent's Life Histories of North American Birds, United States National Museum Bulletins 107, 113, 121, 126, 130, 135, 142; Cooke's Migration Series, in Bird-Lore, 1903-1916, and Oberholser's second series, Migration of North American Birds in Bird-Lore beginning in 1917 and still continuing, compiled from data on file in the Biological Survey; Macoun's Catalogue of Canadian Birds; Preble's Biological Investigation of the Athabaska-Mackenzie Region and his Biological Investigation of the Hudson Bay Region; Headley's Birds of Saskatchewan; Bradshaw's Check-List of the Birds of Saskatchewan; Seton's Birds of Manitoba; Distributional Lists of the Birds of British Columbia (Brooks and Swarth), Montana (Saunders), California (Grinnell), and Arizona (Swarth); Woodcock's Annotated List of Birds of Oregon, Merriam's Biological Reconnaissance of South Central Idaho; Selater's History of the Birds of Colorado; Hoffman's Birds of Nevada; Grave and Walker's Birds of Wyoming; Goss's History of the Birds of Kansas; Swenk's Birds and Mammals of Nebraska; Wetmore's Observations on the Birds of Argentina, Paraguay, Uruguay, and Chile; Forbush's Birds of Massachusetts and other New England States; and local lists in the volumes of the Auk, the Condor, and the Wilson Bulletin. (See Literature Cited at end of book.)

² The measurements are taken from Ridgway's Manual of North American Birds, and Birds of North and Middle America, or, in species described since the publication of these volumes, from recent works or from the type descriptions, and are given in inches and tenths of inches. The "bill" measurement is that of the exposed culmen. In the descriptions of plumage the color of iris, bill, legs, and feet is not given for the Perching Birds unless they are exceptions to the general Passerine rule of brown eyes, black or horn color bill, and black or brownish legs and feet. The colors of the soft parts are subject to individual as well as sexual and seasonal variation, and as comparatively little is known of them current errors can only be corrected by most careful observation and accurate records. The "juvenile plumage" given is the first plumage (after the natal down).

³ When full details of plumages and sequence of molts are desired, consult Ridgway's Birds of North and Middle America (U. S. Nat. Mus. Bull. 50), Bent's Life Histories of North American Birds (Superintendent of Documents, Government Printing Office, Washington, D. C.), Forbush's Birds of Massachusetts and other New England States, and Chapman's Warblers of North America.

taken from the published or manuscript field notes of observers within the State (see *Itineraries*, pp. 15-36)—Jens Knudsen Jensen, Ralph Todd Kellogg, Aldo Leopold, Dr. Walter Iungerish Mitchell, Milton Philo Skinner, and others; but principally from various members of the Biological Survey who have worked in the State long enough to add life-history material to their distribution notes, that appear under "State records"—Clarence Birdseye, James Hamilton Gaut, Maj. Edward Alphonso Goldman, Henry Wetherbee Henshaw (whose first notes were made while on the Wheeler Survey), Ned Hollister, James Stokley Ligon, Prof. Dayton Eugene Merrill, Frank Stephens, Dr. [Frank] Alexander Wetmore, and George Willett; in addition to material obtained during many months of field work throughout the State by Mr. Bailey and myself.

The classification used, in the sequence of Orders and Families, is that recommended by Wetmore and Miller¹ and adopted by the Committee on Nomenclature of the American Ornithologists' Union. Owing to the fact that the Fourth Edition of the A. O. U. Check-List has not yet appeared, the nomenclature adopted is, with some exceptions, that of the Third (1910) Edition and its three supplements.

From various members of the Biological Survey, I have received ready and generous help; for the identification of specimens, assistance in working out ranges of species, and the critical examination of manuscript, I am indebted to Dr. Harry Church Oberholser; for additional help on ranges, I am indebted to Mr. Edward Alexander Preble, and for assistance in gathering distribution data from the files of the Survey accumulated since the death of Professor Cooke, mainly to his daughter, Miss May Thacher Cooke; for the critical examination of the fifty-nine bird maps and the preparation of the route and zone maps, I am indebted to my husband, Mr. Vernon Bailey, from whom also, as well as from Dr. Theodore Sherman Palmer and Mr. Edward Alexander Preble, I have received much valuable criticism, helpful suggestion, and advice. For courtesies extended, I am also indebted to Dr. Witmer Stone and Dr. Alexander Wetmore.

The black and white illustrations are from drawings by Maj. Allan Brooks, Louis Agassiz Fuertes, John Livesy Ridgway, Robert Ridgway, and Ernest Thompson Seton; from photographs in the files of the Biological Survey and others taken by James Stokley Ligon, G. R. Littleton, Olaus Johan Murie, Herman Woodworth Nash, H. and E. Pittman, Russell Reid, Robert Blanchard Rockwell, John Rowley, and Edward Royal Warren, together with photographs of some of the bird groups in the Colorado Museum of Natural History kindly furnished by the Director, Jesse Dade Figgins. Both drawings and photographs, for the

¹Wetmore, A., and W. De W. Miller. The Revised Classification for the Fourth Edition of the A. O. U. Check-List. *The Auk*, XLIII, 337-346, 1926.

most part, have appeared previously in publications of the Bureau of Biological Survey, United States Department of Agriculture; the National Park Service, United States Department of the Interior; the National Association of Audubon Societies; Bird-Lore, and the Handbook of Birds of the Western United States, published by the Houghton Mifflin Company.

Twenty-three of the colored plates are by Maj. Allan Brooks and one by the late Louis Agassiz Fuertes.

DISTRIBUTION OF BIRDS IN NEW MEXICO

The birds of New Mexico affect the agricultural situation according to their status, whether they are merely birds of passage stopping on their way between northern breeding grounds and southern wintering grounds, as some of the sandpipers and plovers; whether they are summer residents, coming in to check the ravages of insects and rodents and the spread of noxious weeds during the period of greatest insect, mammal, and plant activity, as the cuckoos, goatsuckers, swifts, flycatchers, blackbirds, orioles, swallows, vireos, warblers, and others, and some of the hawks, finches, and sparrows; or whether they are permanent residents, carrying on the work of destroying insects, rodents, and weeds throughout the year, as quails and grouse, many of the hawks and owls, the road-runners, woodpeckers, ravens, jays, blackbirds, meadowlarks, wrens, thrashers, chickadees, and nuthatches.

The importance of birds to special interests depends not only on the time they spend in the State, but upon their distribution, whether they confine their good work to the timbered regions or work also in the orchard tracts; whether they make their homes on the mountain peaks or in the agricultural valleys. Their economic value, the special protection to be accorded them, and the efforts made to attract them are therefore matters determinable only by a knowledge of the habits and distribution of each species. But, as Professor Cooke pointed out, the problem of the distribution of the birds of New Mexico is a difficult and complex one. As he said, "the Mountain Bluebird nests from 5,800 to 10,300 feet, ranges in fall to the top of Wheeler Peak, 13,600 feet (aneroid), the highest point in the State, and descends in winter to the lowest valleys of southern New Mexico [about 2,800 feet]; the White-tailed Ptarmigan occupies both summer and winter only a few square miles of the tops of the highest peaks of the Sangre de Cristo Range; the Arizona Hooded Oriole, the Arizona Pyrrhuloxia, and the Crissal Thrasher are found throughout the year in the extreme southwestern part of New Mexico, being restricted to an area containing less than one-twentieth of the State; the Chestnut-collared Longspur breeds far north of New Mexico, but enters the State in the fall, is widely dispersed there through the winter and leaves in April for its summer

home; the Painted Bunting nests in the extreme southern part of the State in the valleys of the Rio Grande and the Pecos, and deserts the States, as well as the United States, for the winter; while the White-rumped Sandpiper, the Baird Sandpiper, and several other shorebirds pass across New Mexico when traveling from their summer homes on the far Arctic coast to their winter homes in southern South America" (MS).

ZONAL DISTRIBUTION OF BREEDING BIRDS

Broadly speaking, the birds of New Mexico may be divided into three zonal categories: Those that breed in the hot Lower Sonoran mesquite and creosote valleys of the Pecos and Rio Grande in the southern part of the State; those that breed in the Upper Sonoran and Transition Zones—on the Upper Sonoran grassy plains and the juniper and nut-pine lower slopes of the mountains, and in the Transition yellow pine middle slopes of the mountains—including by far the largest area of the State; and those that breed on the Boreal Zone mountain heights marked by spruce, fir, and aspen in the Canadian Zone, by dwarf Engelmann spruce, cork-barked fir, and fox-tail pine in the Hudsonian Zone, and by hardy alpine plants in the Arctic-Alpine Zone.

But while the birds of the State may be divided broadly into these three zonal categories, the local student will find it convenient to consider those of each zone separately, as listed by Mr. Bailey in his *Life Zones and Crop Zones of New Mexico* (1913, pp. 19-52).¹ For records since 1913, see *State Records* of individual species.

LOWER SONORAN ZONE

Characterized by mesquite and creosote, armadillo, kangaroo rat, Gila monster, and western diamond rattlesnake.

[Species marked *U.* also occur in the Upper Sonoran Zone.]

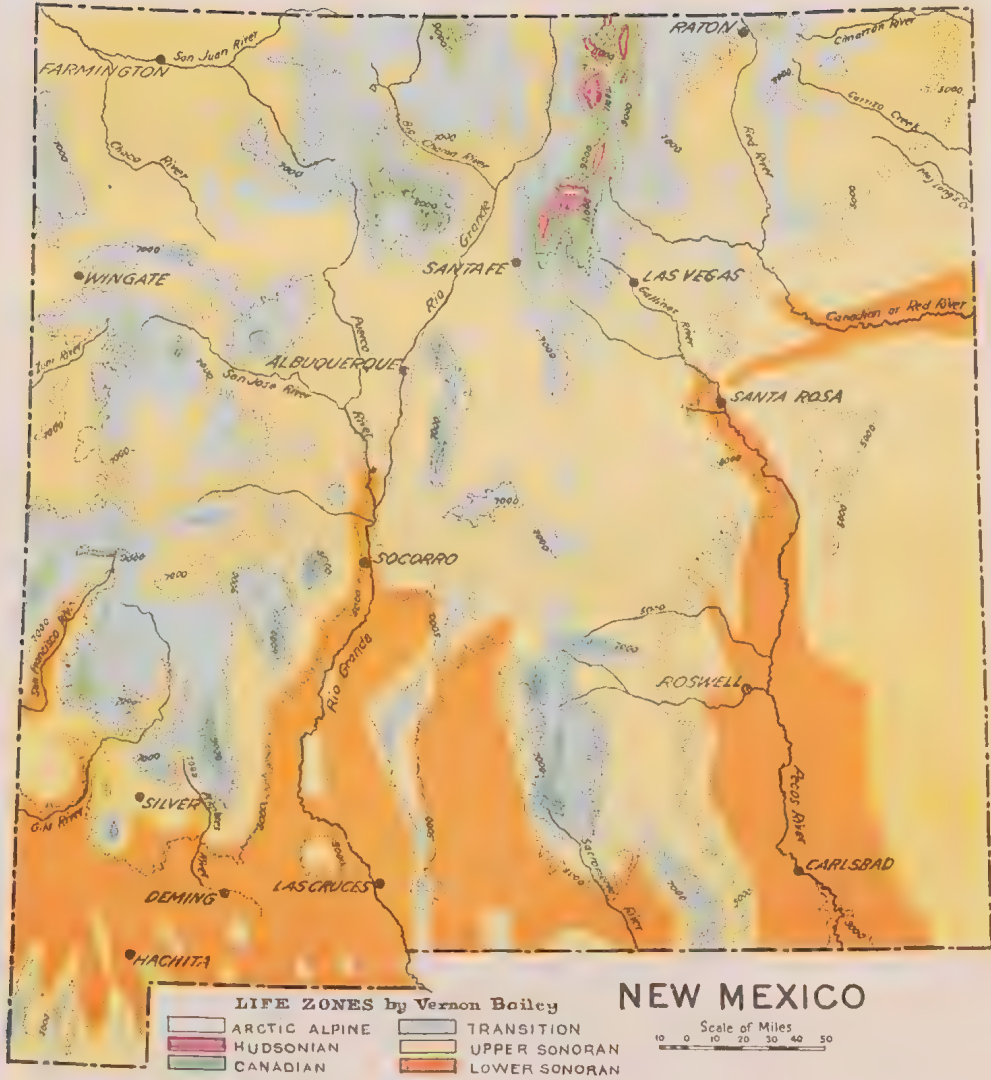
Texas Bob-white.	Rio Grande Meadowlark.
Arizona Scaled Quail. <i>U.</i>	Scott Oriole.
Gambel Quail.	Arizona Hooded Oriole.
White-winged Dove.	Desert Sparrow.
Harris Hawk.	Cassin Sparrow.
Aplomado Falcon.	Abert Towhee.
Audubon Caracara. ²	Gray-tailed Cardinal.
Barn Owl.	Arizona Pyrrhuloxia.
Burrowing Owl. <i>U.</i>	Western Blue Grosbeak. <i>U.</i>
Elf Owl. <i>U.</i>	Painted Bunting.
Road-runner.	Phainopepla.
Cactus Woodpecker.	Western Mockingbird. <i>U.</i>
Gila Woodpecker.	Curve-billed Thrasher. <i>U.</i>
Texas Nighthawk.	Bendire Thrasher.
Costa Hummingbird.	Crissal Thrasher.
Cassin Kingbird. <i>U.</i>	Cactus Wren.
Black Phoebe.	Canyon Wren. <i>U.</i>
Vermilion Flycatcher.	Verdin.
Chihuahua Horned Lark.	Plumbeous Gnatcatcher.
White-necked Raven.	

¹ In some cases names have been changed to conform with the text.

² Breeding record doubtful.



MAP OF LIFE ZONES IN NEW MEXICO



MAP OF LIFE ZONES IN NEW MEXICO

UPPER SONORAN ZONE

Characterized by nut pine and juniper, antelope, mountain sheep, prairie-dog, horned toad, and plains and black-tailed rattlesnakes.

[Species marked *L.* breed also in the Lower Sonoran Zone; those marked *T.* also in the Transition.]

Ruddy Duck. <i>T.</i>	Western Meadowlark. <i>T.</i>
Cinnamon Teal. <i>T.</i>	Bullock Oriole. <i>L.</i>
Long-billed Curlew.	House Finch. <i>L.</i>
Mountain Plover.	Arkansas Goldfinch. <i>L.</i>
Arizona Scaled Quail. <i>L.</i>	Western Lark Sparrow. <i>L.</i>
Mearns Quail.	Worthen Sparrow.
Mourning Dove. <i>L.</i>	Black-chinned Sparrow.
Arizona Spotted Owl. <i>T.</i>	Sage Sparrow (breeding?).
Mexican Screech Owl.	Scott Sparrow.
Burrowing Owl. <i>L.</i>	Canyon Towhee.
California Cuckoo. <i>L.</i>	Lazuli Bunting.
Arizona Woodpecker.	Lark Bunting. <i>T.</i>
Poor-will.	Cooper Summer Tanager.
Western Nighthawk. <i>T.</i>	White-rumped Shrike.
White-throated Swift. <i>T.</i>	Yellow Warbler. <i>T.</i>
Kingbird. <i>T.</i>	Western Yellow-throat. <i>L.</i> and <i>T.</i>
Arkansas Kingbird. <i>T.</i>	Long-tailed Chat. <i>L.</i>
Ash-throated Flycatcher. <i>L.</i>	Catbird. <i>T.</i>
Buff-breasted Flycatcher.	Rock Wren. <i>T.</i>
Montezuma Horned Lark.	Baird Bewick Wren.
Woodhouse Jay.	Western Marsh Wren.
Raven. <i>T.</i>	Gray Titmouse.
Western Crow. <i>T.</i>	Bridled Titmouse.
Pinyon Jay.	Lead-colored Bush-Tit.
Yellow-headed Blackbird. <i>T.</i>	Lloyd Bush-Tit.
Nevada Redwing.	Western Gnatcatcher. <i>L.</i>

TRANSITION ZONE

Characterized by yellow pine, Abert squirrel, chipmunks, and porcupine.

[Species marked *U.* breed also in the Upper Sonoran Zone; those marked *C.* also in the Canadian.]

Ruddy Duck. <i>U.</i>	Brewer Sparrow. <i>U.</i>
Cinnamon Teal. <i>U.</i>	Red-backed Junco. <i>C.</i>
Shoveller. [<i>U.</i> and <i>L.</i>]	Mountain Song Sparrow.
Dusky Grouse. <i>C.</i>	Spurred Towhee. <i>U.</i>
Merriam Turkey.	Green-tailed Towhee.
Band-tailed Pigeon.	Black-headed Grosbeak. <i>U.</i>
Sharp-shinned Hawk. <i>C.</i>	Western Tanager.
Cooper Hawk.	Hepatic Tanager. <i>U.</i>
Flammulated Screech Owl.	Plumbeous Vireo.
Saw-whet Owl. ¹	Virginia Warbler.
Pygmy Owl.	Orange-crowned Warbler.
Rocky Mountain Hairy Woodpecker. <i>C.</i>	Olive Warbler.
White-breasted Woodpecker.	Audubon Warbler. <i>C.</i>
Mearns Woodpecker. <i>U.</i>	Grace Warbler.
Lewis Woodpecker.	Black-throated Gray Warbler.
Red-shafted Flicker. <i>C.</i>	Macgillivray Warbler. <i>C.</i>
Stephens Whip-poor-will.	Painted Redstart.
Western Nighthawk. <i>U.</i>	Red-faced Warbler.
White-throated Swift. <i>U.</i>	Sage Thrasher.
Blue-throated Hummingbird.	Western House Wren. <i>U.</i>
Black-chinned Hummingbird. <i>U.</i>	Rocky Mountain Nuthatch.
Western Wood Pewee.	Pygmy Nuthatch.
Wright Flycatcher.	Mexican Chickadee.
Desert Horned Lark. <i>U.</i>	Mountain Chickadee.
American Magpie.	Willow Thrush.
Rocky Mountain Evening Grosbeak.	Western Robin. <i>C.</i>
Western Vesper Sparrow. <i>U.</i>	Chestnut-backed Bluebird.
Western Chipping Sparrow. <i>U.</i>	

¹ No definite breeding record.

CANADIAN ZONE

Characterized by spruce, fir, and aspen, woodchuck, spruce squirrel, elk, and deer.

[Species marked *T.* breed also in the Transition Zone; those marked *H.* also in the Hudsonian Zone.]

Merganser. <i>T.</i>	Red-breasted Nuthatch.
Dusky Grouse. <i>T.</i>	Olive-sided Flycatcher.
Western Goshawk. ¹	Western Flycatcher. <i>T.</i>
Alpine Three-toed Woodpecker. <i>H.</i>	Long-crested Jay. <i>T.</i>
Red-naped Sapsucker. <i>T.</i>	Rocky Mountain Canada Jay. <i>H.</i>
Rocky Mountain Sapsucker. <i>T.</i>	Cassin Purple Finch.
Broad-tailed Hummingbird. <i>T.</i>	Mexican Crossbill. <i>T.</i>
Calliope Hummingbird. ² <i>T.</i>	Pine Siskin.
White-crowned Sparrow. <i>H.</i>	Long-tailed Chickadee. <i>T.</i>
Gray-headed Junco. <i>H.</i>	Golden-crowned Kinglet. <i>H.</i>
Lincoln Sparrow.	Ruby-crowned Kinglet.
Northern Violet-green Swallow. <i>T.</i>	Townsend Solitaire.
Pileolated Warbler.	Audubon Hermit Thrush.
Water-ouzel. <i>T.</i>	Mountain Bluebird. <i>T.</i>
Rocky Mountain Creeper.	

HUDSONIAN ZONE

Characterized by foxtail pine, dwarf cork-barked fir, and Engelmann spruce.

[Species marked *C.* also breed in the Canadian Zone.]

Alpine Three-toed Woodpecker. <i>C.</i>	White-crowned Sparrow. <i>C.</i>
Rocky Mountain Canada Jay. <i>C.</i>	Gray-headed Junco. <i>C.</i>
Rocky Mountain Pine Grosbeak.	Golden-crowned Kinglet. <i>C.</i>

ARCTIC-ALPINE ZONE

Characterized by dwarf alpine flowers.

White-tailed Ptarmigan.	Hepburn Rosy Finch. ³
Pipit.	Black Rosy Finch. ³
Gray-crowned Rosy Finch. ³	Brown-capped Rosy Finch.

VALUE OF BIRDS TO THE STATE

The value of birds, from the educational, recreational, esthetic, humanitarian, and economic points of view, is coming to be almost a commonplace; but in New Mexico, where natural climatic advantages afford rare opportunities both for nature study, out-of-door life, and for agricultural and horticultural development, the birds of the State become a peculiarly important asset.

From the economic point of view they are directly instrumental in the conservation of man's agricultural output. As has been pointed out by Mr. Henshaw, "in satisfying their own hunger, birds perform an important service to man," for "the destruction of farm and orchard crops by insects and rodents amounts to many millions each year." Moreover, insects are carriers of both plant and animal diseases. As to the economic problem Herbert Hoover wrote, during the war, "I hope the people of the United States realize how closely related to this whole question of food saving is the question of the protection and encouragement of insectivorous and migratory birds."

¹ Not positively known to breed. So little work has been done in this zone during the early breeding season that the list is very incomplete.

² No definite breeding record.

³ Recorded since the publication of Life Zones and Crop Zones of New Mexico.

That such realization has been reached to no small degree is evidenced by the fact that in 1916 a treaty was signed by the United States and Great Britain for the protection of insectivorous, game, and non-game birds migrating between the United States and Canada, probably the most important single measure ever taken for the preservation of bird life. In further evidence, the United States, recognizing the evils resulting from the wholesale destruction of birds for millinery purposes, by a tariff act of 1913, prohibited the entry of plumage of wild birds, either raw or manufactured, not for scientific or educational purposes; and the Canadian Government in furtherance of the same purpose by an act in 1915 rendered all importations of wild birds' plumage illegal, except the feathers of the ostrich, pheasant, and peacock, of birds used for food, and of specimens for scientific purposes.

Recognition of the importance of educational propaganda regarding the value of birds to the State has been shown not only by the Federal Government in its Biological Survey publications on the food of birds and the best means of attracting them to various parts of the country, but by State Audubon societies, State boards of agriculture, and by the publication of important treatises on the birds of the respective States.

Recognition of the value of birds is strikingly demonstrated by the large number of Federal and State refuges established and associations for the conservation of wild life organized throughout the country.

NATIONAL AND STATE REFUGES AND STATE ORGANIZATIONS FOR THE CONSERVATION OF WILD LIFE ¹

NATIONAL AND STATE REFUGES

Refuges for the protection of birds and game are Federal, State, or Municipal.

In New Mexico there are two Federal bird refuges, fifty-eight big game refuges, and twenty-one State bird refuges, making in all, eighty-one tracts of land where birds are afforded protection.

The two Federal bird refuges are both on reclamation projects—that of Carlsbad on the Pecos, which has two reservoirs, Lake Avalon and Lake MacMillan; and that on the Rio Grande, which is some thirty miles long, extending up the Rio Grande from Elephant Butte dam.

The fifty-eight State big game refuges, mainly in the mountainous sections of the State, aggregating 1,606,900 acres, have been established for the purpose of providing safe sanctuaries in which game may breed and from which it may spread to adjacent hunting ranges. But while they are intended to protect deer, bear, and mountain sheep, they also

¹ Ligon, J. S. Wild Life of New Mexico: Its Conservation and Management, pp. 171-184, 1927.

afford protected breeding grounds for Wild Turkey, Band-tailed Pigeons, Dusky Grouse, various quails including the Mearns' or Fool Quail, and the rare White-tailed Ptarmigan of arctic-alpine mountain tops—all birds of great economic or zoologic interest whose preservation is greatly to be desired.

The twenty-one State bird refuges afford protection for both land and water birds.

STATE ORGANIZATIONS

Forty-four States now have State associations for the protection of game, many of which have done important work by helping to procure proper laws for the protection of birds, and helping to establish bird refuges; by advocating the establishment of game farms; introducing pheasants, Hungarian partridges, and bob-whites; by restocking bird refuges and game farms; and by carrying on educational campaigns by means of illustrated lectures and the publication and distribution of pamphlets and State bird reports.

In New Mexico the first game law was enacted in 1880 but the only birds to which it applied were turkeys, grouse, and quail. From 1898 to 1903, game protection work was done mainly by the League of American Sportsmen in cooperation with the local organizations, but in 1903, the office of State Fish and Game Warden was created, and in 1912 the game protection work was organized as a department of the State. Previous to 1914, game protection in New Mexico followed closely the ideas and activities then prevalent in most States. Any efforts at constructive work were handicapped by unstable tenure of office, limited authority, insufficient funds, and lack of any concrete program or cooperation on the part of the sportsmen and conservationists of the State.

But in 1914, under the leadership of Miles W. Burford, a strong sportsmen's association was formed at Silver City; soon after a similar one was formed at Albuquerque, and in 1916 a State-wide organization was established under the name of the New Mexico Game Protective Association. By the cooperation of the State warden and local shooting clubs a program was agreed upon for improved game and license regulations, including non-partisan warden service and the support of the warden's office by receipts from hunting licenses instead of by appropriations from the State.

In 1921 an act was passed providing for an unpaid commission of three members to constitute a Board of Directors in full charge of the game resources of the State. It conferred on this Board full authority to hire their own executive officers, to declare suitable open or closed seasons in any locality at any time, to establish a system of game and bird refuges by proclamation, to establish and operate fish hatcheries, to manage the funds of the Game Department, and, in

general, to make such rules and regulations and establish such service as might be necessary for the management of the game and fish resources of the State. The Act provided for a graduated change of personnel, each incoming Governor appointing one Commissioner, to insure continuity of policy. In 1925 the appointment of the State Game Warden was also placed in the hands of the State Game Commission.

Shortly after their appointment in 1921 the game commissioners, with the assistance of fourteen local associations, having a total of 1,000 members, proceeded to establish the present system of refuges, receiving valuable cooperation from the U. S. Forest Service in the selection and operation of the big game refuges within the National Forests. Since then, law enforcement, with the backing of the local associations, has improved to the extent of trebling the revenues of the Game Department. In the Silver City region there has been in successful operation for three years a special form of cooperative patrol in which the State, the local associations, and the Forest Service all pool their resources in a common plan for handling the big-game season. It has worked so successfully that it is being extended to the other big-game regions of the State. Predatory-animal control conducted by the Biological Survey in cooperation with the State and live-stock interests has contributed greatly to the actual improvement of game conditions.

In general, New Mexico has built solid foundations for a system of wild-life management. While a few of the rare or badly depleted species like antelope, mountain sheep, and ptarmigan have continued to decrease, the principal game species have probably held their own during the last decade. With an active, intelligent body of organized sportsmen, in spite of many handicaps, it is safe to hope that by the continued cooperation of Federal, State, and private agencies the State's wild life may still be fairly well conserved.

BIRDS FIRST DESCRIBED FROM NEW MEXICO

It is interesting to know that a number of birds new to North America have been discovered and described from New Mexico, mainly by the early explorers of the State.

1. Birds described from New Mexico which are recognized in the Third Edition of the A. O. U. Check-List of North American Birds, or in other publications since 1910.

Species of Bird	Type Locality	Present Location of Type Specimen ¹
<i>Anas diazi novimexicana</i> Huber.	Near Las Cruces	Coll. Wharton Huber, Philadelphia, No. 1928.
<i>Buteo borealis calurus</i> Cassin..	Near Fort Webster, Mimbres River.	Originally U. S. N. M., Washington, No. 8527. Withdrawn by Henry in 1859, and now A. N. S. Philadelphia, No. 1516.
<i>Numenius americanus occidentalis</i> Woodhouse.	Near Albuquerque	U. S. N. M., Washington, No. 12644. Type destroyed in 1888.

¹ A. N. S., Collection Academy Natural Sciences; U. S. N. M., U. S. National Museum.

Species of Bird	Type Locality	Present Location of Type Specimen
<i>Glaucidium gnoma pinicola</i> Nelson	Alma.....	U. S. N. M. (Biol. Surv. coll.), Washington, No. 206021.
<i>Chordeiles minor henryi</i> Cassin	Rio Grande Lat. 32°....	A. N. S., Philadelphia, No. 24179.
<i>Sphyrapicus varius nuchalis</i> Baird.	Mimbres River.....	Originally U. S. N. M., Washington, No. 6042. Withdrawn by Henry in 1859 and now A. N. S., Philadelphia, No. 24223.
<i>Dryobates villosus leucothorectis</i> Oberholser.	Near Burley.....	U. S. N. M. (Biol. Surv. coll.), Washington, No. 196291.
<i>Dryobates pubescens orcoecus</i> Batchelder. (now known as <i>homorus</i>).	Las Vegas Hot Springs..	Coll. C. F. Batchelder, Cambridge, Mass.
<i>Otocoris alpestris occidentalis</i> (McCall).	Santa Fe.....	A. N. S., Philadelphia, No. 14883.
<i>Aphelocoma woodhouseii</i> (Baird)	Fort Thorn.....	U. S. N. M., Washington, No. 8484.
<i>Penthestes gambeli gambeli</i> Ridgway.	"One day's journey west of Santa Fe."	The name is merely a substitute for <i>Parus montanus</i> and there is no type. The type of <i>montanus</i> , supposed to be in A. N. S., Philadelphia, is missing.
<i>Thryomanes bewickii eremophilus</i> Oberholser.	Big Hatchet Mountains.	U. S. N. M., Washington, No. 126674 (not No. 126774 as in original description).
<i>Telmatodytes palustris plesius</i> (Oberholser).	Fort Wingate.....	U. S. N. M., Washington, No. 114938.
<i>Toxostoma crissale</i> Henry	Fort Thorn.....	A. N. S., Philadelphia, No. 23713.
<i>Vermivora virginiae</i> (Baird)...	Fort Burgwyn.....	U. S. N. M., Washington, No. 10719.
<i>Vermivora celata orestera</i> Oberholser.	Willis.....	U. S. N. M. (Biol. Surv. coll.), Washington, No. 136782.
<i>Piranga rubra cooperi</i> Ridgway.	Los Pinos.....	U. S. N. M., Washington, No. 34344.
<i>Pipilo aberti</i> Baird.	New Mexico.....	U. S. N. M., Washington, No. 12532. Missing.
<i>Junco phaeonotus dorsalis</i> Henry	Fort Stanton.....	U. S. N. M., Washington, No. 9271, but not to be found. If, as believed, it was misnumbered "9270" it was withdrawn by Henry and is now in A. N. S., Philadelphia.
<i>Spizella wortheni</i> Ridgway....	Silver City.....	U. S. N. M., Washington, No. 98512.

2. Birds originally described from New Mexico as distinct species or subspecies, but which are now regarded as identical with others previously named, and so can not be recognized in the Check-List.

Species of Bird	Type Locality	Present Location of Type Specimen
<i>Anser frontalis</i> Baird [Synonym of <i>Anser albifrons gambeli</i> (Hartlaub)].	New Mexico.....	A. N. S., Philadelphia, No. 6055.
<i>Buteo oxypterus</i> Cassin [Synonym of <i>Buteo swainsoni</i> Bonaparte].	Near Fort Webster....	A. N. S., Philadelphia, No. 1465.
<i>Grus fraterculus</i> Cassin [Synonym of <i>Grus canadensis canadensis</i> (Linnaeus)].	Albuquerque.....	U. S. N. M., Washington, No. 10378.
<i>Acanthylis saxatilis</i> Woodhouse [Synonym of <i>Aeronautes melanoleucus</i> (Baird)].	Inscription Rock.....	(No type).
<i>Cyanocitta macrolopha</i> Baird [Synonym of <i>Cyanocitta stelleri diademata</i> (Bonaparte)].	100 miles west of Albuquerque.	U. S. N. M., Washington, No. 8351.
<i>Cyanocorax cassini</i> (McCall) [Synonym of <i>Cyanocephalus cyanocephalus</i> (Maximilian)].	Santa Fe.....	Cannot be found in A. N. S., Philadelphia.
<i>Parus albesens</i> Baird [Synonym of <i>Penthestes atricapillus septentrionalis</i> (Harris)].	"New Mexico".....	U. S. N. M., Washington, No. 6766.
<i>Sylvicola nigricans</i> [misprint for <i>nigrescens</i>] Townsend. [Synonym of <i>Dendroica nigrescens</i> (J. K. Townsend)].	"New Mexico".....	U. S. N. M., Washington, No. 1908.
<i>Carpodacus obscurus</i> McCall. <i>Carpodacus familiaris</i> McCall [Synonyms of <i>Carpodacus mexicanus frontalis</i> (Say)].	Santa Fe.....	Type not found in A. N. S., Philadelphia, or U. S. N. M., Washington.
<i>Junco oreganus shufeldti</i> Coale [Synonym of <i>Junco hyemalis connectens</i> Coues].	Fort Wingate.....	U. S. N. M., Washington, No. 106035.
<i>Plectrophanes melanomus</i> Baird [Synonym of <i>Calcarius ornatus</i> (J. K. Townsend)].	Fort Thorn.....	U. S. N. M., Washington, No. 6290.

FOSSIL BIRDS FOUND IN NEW MEXICO

There is evidence that in the far distant past New Mexico possessed a bird fauna very different from the present one. A fragmentary specimen of an extinct bird somewhat larger than an ostrich, now in the U. S. National Museum, was found by Professor Cope in the Eocene of New Mexico and described under the name *Diatryma gigantea*. A practically complete skeleton of another fossil bird of the same genus, *D. steini*, was found in 1916 in the Bighorn Badlands of Wyoming and is now in the American Museum of Natural History in New York.¹

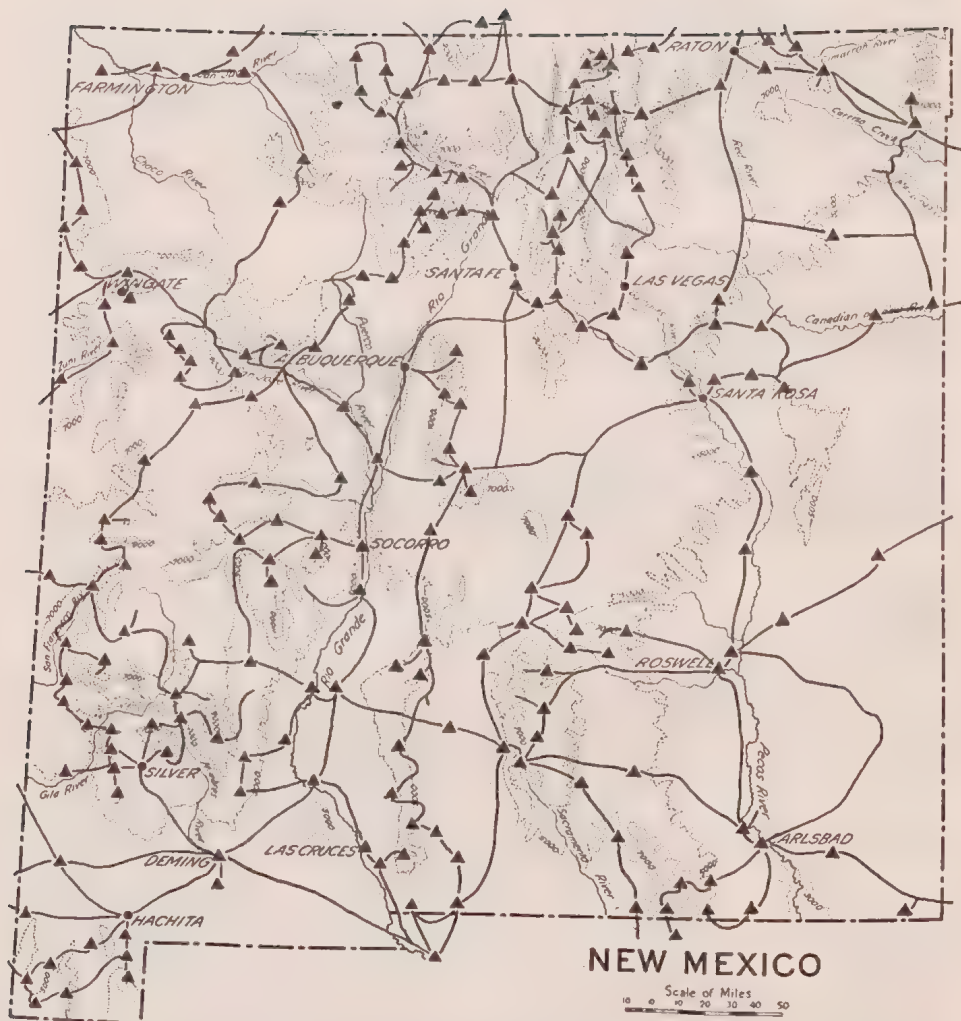
In the late Tertiary sands north of Pojuaque, northwest of Santa Fe, Professor Cope found the remains of a rapacious bird intermediate in size between the Golden Eagle and the Turkey Vulture, described as *Palaeoborus umbrosus*.²

LOCATION OF COLLECTIONS MADE IN NEW MEXICO

<i>Name of Collector</i>	<i>Location</i>
Aiken, C. E. H.....	Mainly in Colorado College, Colorado Springs, Colo.
Anderson, W. W.....	U. S. National Museum, Washington, D. C.
Anthony, A. W.....	Carnegie Museum, Pittsburgh, Pa.
Barber, C. M.....	College of Agriculture and Mechanic Arts, Mesilla Park, N. Mex.
Batchelder, C. F.....	Cambridge, Mass.
Bendire, C. E.....	U. S. National Museum, Washington, D. C.
Biological Survey.....	U. S. National Museum, Washington, D. C.
Birtwell, F. J.....	College of Agriculture and Mechanic Arts, Mesilla Park, N. Mex.
Coues, Elliott.....	U. S. National Museum, Washington, D. C.
Heermann, A. L.....	U. S. National Museum, Washington, D. C.
Henry, T. C.....	U. S. National Museum, Washington, D. C., and Academy of Natural Sciences, Philadelphia, Pa.
Henshaw, H. W.....	U. S. National Museum, Washington, D. C., and Natural History Museum, London.
Jensen, J. K.....	Santa Fe, New Mexico (eggs).
Kellogg, R. T.....	Silver City, N. Mex.
Mearns, E. A.....	U. S. National Museum, Washington, D. C. (in part)
Metcalfe, O. B.....	College of Agriculture and Mechanic Arts, Mesilla Park, N. Mex.
Nelson, E. W.....	U. S. National Museum, Washington, D. C. (in part)
Palmer, Edward.....	U. S. National Museum, Washington, D. C.
Seton, E. T.....	Greenwich, Conn.
Shufeldt, R. W.	U. S. National Museum, Washington, D. C.
Stejneger, L. H.....	U. S. National Museum, Washington, D. C.
Stephens, Frank.....	Aiken's collection, Colorado College, Colorado Springs, Colo.
Stevenson, Col. James....	U. S. National Museum, Washington, D. C.
Woodhouse, S. W.....	U. S. National Museum, Washington, D. C.

¹Granger, Walter, Bird-Lore, XIX, 193-199, 1917. Casts of *D. steini* are now in the American Museum, the National Museum, and others.

²Cope, E. D., Proc. Acad. Nat. Sci. Philadelphia, 1874, 151.



MAP 1. ROUTES AND COLLECTING LOCALITIES OF BIOLOGICAL SURVEY PARTIES
IN NEW MEXICO
Prepared by Vernon Bailey

ITINERARIES AND REPORTS OF FIELD WORK IN THE STATE

By WELLS WOODBRIDGE COOKE¹

IN the surveys and explorations of New Mexico prior to 1870, bird work was of secondary importance, and dates and specific localities were largely omitted from the published records. To remedy this defect and to place the records as nearly as possible, the following chronological list of surveys and explorations has been compiled, giving a condensed statement of the localities visited by each observer whose notes have contributed to a knowledge of the birds of the State, together with the dates of his visits, in so far as they can be obtained, his chronological position in the list being determined by the year his work began. By reference to this list, the notes found under the various species may be approximately located. Where the notes have been published, detailed references are cited.

1540-1542. Francisco Vazquez de Coronado (about 1500-1549).²

The discovery of Arizona and New Mexico has been attributed to Fray Marcos de Niza, a Franciscan Friar who was sent by Coronado, the Spanish governor of New Galicia in western Mexico, on a reconnaissance to ascertain the truth of the many rumors regarding what have become famous as the fabulous "Seven Cities of Cibola," cities whose streets were "exclusively occupied by workers in gold and silver." The guide of Fray Marcos' party, Estevan, an Arabian negro who had escaped from an ill fated exploring expedition to Florida, being sent on in advance of the Friar, actually reached the Seven Cities—the pueblos of Zuni—but was promptly killed by justly infuriated Indians for dastardly conduct. Friar Marcos, after getting a distant view of one of the "cities," wisely left the country, going back to report to Coronado in Mexico.

Coronado, feeling justified by his reports of the country passed through, proceeded to organize an expedition to explore and conquer the new land. In 1540, therefore, as captain general of an assembled army of Spanish horsemen and Indians, he started on what proved to be a two years' journey to the north, extending from Culiacan, Sinaloa, in western Mexico at about the 25th degree of latitude to northern Kansas at about the 40th degree—roughly a thousand miles.

The route taken from Culiacan led northwest parallel to the Gulf of California through Yaquimi and Sonora³ then north to Arizona, past what is now Tucson and on to the Gila River, entering New Mexico by the San Francisco River, following through the Mogollon Mountains, and thence north to Zuni. Seven small pueblos were found here, which it was hard for the disappointed and chagrined Spaniards to accept as the much glorified Seven Cities of Cibola.

¹ Since Professor Cooke's death in 1916, this list has been brought down to date, making it cover a period of a hundred and eight years, 1820-1928 (or dating from Coronado, 1540, three hundred and eighty-eight years).—F. M. B.

² Figures preceding names indicate the date when the observer was in New Mexico, those in parentheses following names, the year of birth or (if the person is now deceased) the years of birth and death.

³ A relief expedition with supplies had been sent up the Gulf, as it was supposed that Coronado's army would be within reach of the water. A second branch expedition, under Melchior Diaz, was sent from Sonora northwestward to and around the head of the Gulf of California.

From Zuni, Coronado and his captains explored the pueblo region of Arizona and New Mexico—visiting Moqui and Hopi—and after twenty days in the desert, discovered the Grand Canyon of the Colorado River. In New Mexico the various parties visited and conquered some sixty-six Indian villages, among them, Acoma, Cochiti, San Domingo, San Felipe, Santa Ana, Sia, Jemez, Chamita, and Taos, after which winter quarters were taken up in the Rio Grande pueblos of the Tigueans.

During their stay in the Pueblo region, the Spanish soldiers did much to outrage the Indians, even to burning villages and killing the inhabitants. As it is said by General Simpson, "no more barbarous treachery was ever shown to a submissive foe than that accorded the Rio Grande Indians by these faithless Spaniards."¹

As the result, after an unsuccessful general uprising, a plan was made to destroy the army, and when the winter was over, Coronado, incited by the planned false representations of gold and silver in the Gran Quivira country, left the Rio Grande for Pecos, whence he was decoyed far out across the great plains through herds of buffalo "as far as the eye could see." Finding himself deceived, however, Coronado sent back to the Rio Grande all but thirty of the best equipped horsemen, with whom he pressed on to Quivira. Here again finding none of the mineral of which they were in search, they turned back and rejoined the army for a second winter on the Rio Grande; after which, thoroughly discouraged in their search for gold, in the spring of 1542 they started back to Mexico.

As Winship says, "Coronado found no gold in the land of the Seven Cities or in Quivira, but his search added much to the geographic knowledge of the Spaniards."² Not only had they explored the Pueblo country of Arizona and New Mexico, and seen the Grand Canyon of the Colorado, but they had journeyed across the great plains to northern Kansas.

All Spanish explorers were expected to record their scientific observations, but the natural history notes recorded by Casteñada, from whose narrative most of our knowledge of the Coronado expedition is derived, were meagre, dealing mainly with animals whose skins were found in the pueblos, especially the buffaloes or "cows covered with a frizzled hair which resembles wool."

The few birds noted are of peculiar interest as being the first recorded not only from New Mexico, but the first recorded from the United States. We are told that "quail" were given to Friar Marcos by the Indians. Of other birds seen by the way, Casteñada notes that in the fields "a very large number of cranes and wild geese and starlings [blackbirds?] live on what is sown." Summing up, he writes, "There are a great many native fowl in these provinces, and cocks [wild turkeys] with great hanging chins." Long robes and dresses made "of the feathers of the fowles" were seen in the pueblos. Also "tame eagles, which the chiefs estimated to be something fine." Coronado, writing to Mendoza, from Zuni, August 3, 1540, shows less interest in the subject, saying "We found fowles, but only a few, and yet there were some. The indians tell me that they do not eat these in any of the seven villages, but that they keep them merely for the sake of procuring the feathers." Ignorant of the sacred, ceremonial uses of the feathers, he comments as a cynical epicure, "I do not believe this, *because they are very good* [*italics mine*], and better than those of Mexico."—F. M. B.

1820. Stephen Harriman Long (1784–1864).

The famous Expedition from Pittsburgh to the Rocky Mountains, under the command of Maj. Stephen Harriman Long of the Engineer Corps, divided forces at their camp on the Arkansas River, 18 miles above the mouth of the Purgatory (now

¹ Simpson, James H., U. S. A. Coronado's march in search of the "Seven cities of Cibola" and discussion of their probable location, with map (Smiths. Inst. Ann. Rept., 1869, pp. 309–340).

² Winship, George Parker. The Coronado Expedition, 1540–1542, with bibliography (Bureau of Ethnology, 14th Ann. Rept. 1892–93, pp. 329–613, pls. 38–81).

called Las Animas River), in Colorado, on July 24, 1820. The larger company descended the valley of the Arkansas, and did not enter New Mexico. A party comprising ten men, including Major Long, William James, botanist and geologist, and Titian R. Peale, proceeding southward in search of the headwaters of Red River, entered New Mexico at the head of Major Long's Canyon, a few miles southwest of the present town of Trinidad, Colorado, on July 27. Still traveling southward, they struck Mora River, descended its valley to its junction with the Canadian and followed this eastward into Texas. It is impossible to trace the route with certainty, and in consequence the exact date when the party passed out of New Mexico can not be determined, but it could not have been earlier than the 10th or 12th of August. Assuming this, the notes relating to New Mexico occupy pages 75 to about 100 of Volume 2 of the official account of the expedition, compiled by Edwin James from the journals of Major Long and other members of the party. (Account of an expedition from Pittsburgh to the Rocky Mountains, two volumes and Atlas, Philadelphia, 1823.)

1841. William Gambel (1819?-1849).

At the suggestion of Thomas Nuttall, a trip in the western United States was undertaken by William Gambel for the purpose of making botanical and ornithological collections. No itinerary of the trip has ever been published and Gambel's own references to his wanderings are very vague. While his route is uncertain, his journeyings seem to have occupied about four years, beginning with a trip across the Plains, in which he crossed the Arkansas and Cimarron Rivers in June, 1841, and arrived at Santa Fe in July. This indicates that he entered New Mexico over the regular Santa Fe Trail. He spent part of July and August at Santa Fe and went thence to [Little] Salt Lake. His specimens he refers broadly to the "Rocky Mountains of the Interior," but he mentions crossing the Green River in September and was at [Little] Salt Lake in October, so that he probably went from Santa Fe through northern New Mexico, crossing the Green River near its mouth.

Some of his notes were published before he completed his trip, as: Descriptions of Some New and Rare Birds of the Rocky Mountains and California (Proc. Acad. Nat. Sci., Philadelphia, pp. 259-262, 1843). A more extended report was made on his return, as: Remarks on the Birds Observed in Upper California, with Descriptions of New Species (Journ. Acad. Nat. Sci., Philadelphia, pp. 25-26, 1847, and pp. 215-229, 1849).

1845-1846. James William Abert (1820-1897).

In the fall of 1845, Lieutenant (later Major) James W. Abert made a trip of exploration through northeastern New Mexico. He left Bent's Fort, on the Arkansas River in Colorado, the middle of August and entered New Mexico through Raton Pass, August 24. Striking there the headwaters of the Canadian River, he followed down this stream and crossed into Texas, September 5. He published an account of this trip under the title: Report of the Expedition Led by Lieutenant Abert on the Upper Arkansas and Through the Country of the Comanche Indians, in the Fall of the Year 1845: Journal of Lieut. J. W. Abert from Bent's Fort to St. Louis in 1845 (29th Cong., First Sess., Sen. Doc. VIII, No. 438, pp. 1-75, 1846).

The following year Lieutenant Abert went with Lieut. W. H. Emory as far as Bent's Fort on the Arkansas. He remained there on account of sickness but finally started September 9, 1846, for Santa Fe. His route led up Timpa Creek, across to the Purgatory, up that stream to Raton Pass, which was traversed September 19, through Mora, September 23 and Las Vegas, September 24. Crossing the Pecos at San Miguel, September 26, he went up stream to Pecos City and reached Santa Fe September 27.

On September 29 he visited the placer gold mines, 30 to 40 miles to the south of Santa Fe, returning on October 20. Leaving Santa Fe October 8, he was at Galisteo Creek, October 9; Algodones, October 12; Bernalillo, October 13; Albuquerque, October 15; Laguna, October 20; Acoma, October 21; Rito, October 23; Albuquerque, October 25; Padillas, October 28; Isleta, October 29; Tajique, November 1; Abo, November 4; Casa Colorado, November 6; La Joya, November 8; Socorro, November 10; near Socorro, November 12; near San Pedro, November 14; and near San Marcial, November 15-December 15; Socorro, December 16; Bernalillo, December 20; and reached Santa Fe December 23. Leaving Santa Fe December 28, he was at Las Vegas, January 1, 1847; The Ocate, January 4; and Raton Pass, January 14; crossing into Colorado, January 15. For the main report of this trip see William H. Emory. . A report of the birds seen from Fort Leavenworth, Missouri, to Santa Fe, New Mexico, and return, was published by Lieutenant Abert in the *Journ. Cincinnati Soc. Nat. Hist.*, V, pp. 57-59, 1882, and notes on his specimens were published by S. F. Baird as: *Birds Collected in New Mexico by Lieutenant Abert, in Stansbury's Great Salt Lake*, pp. 325-326, 1852.

1846. William Hensley Emory (1811-1887).

The year following the expedition of Lieut. J. W. Abert, a company of soldiers under command of Col. Stephen Watts Kearny was sent during the summer of 1846 against the Spanish settlements in New Mexico and California, the expedition being accompanied by Lieutenant Emory, who made observations in natural history along the route. The party left Bent's Fort on the Arkansas in southern Colorado, August 2, 1846; entered New Mexico, August 6; and passed through Raton Pass to the headwaters of the Canadian River; went along the eastern foothills and reached Las Vegas, August 14; Pecos, August 17; and Santa Fe the next day. They left Santa Fe September 2, crossed to the Rio Grande at Algodones, September 3; and went down the river to Tome, September 8; returning September 11 to Santa Fe. Leaving there September 26, they reached Albuquerque, September 29; Tome, October 1; and Socorro, October 5. Leaving the Rio Grande, near Las Palomas, October 15, they crossed the summit of the Mimbres Mountains, October 17; were at the Copper Mine, October 18; reached the upper waters of the Gila, October 20; followed the Gila down stream and passed into Arizona, October 22. No formal report was made on the birds of the districts visited, but bird notes are scattered through the report which was published as: *Notes of a Military Reconnaissance from Fort Leavenworth in Missouri, to San Diego in California, Including Parts of the Arkansas, Del Norte, and Gila Rivers* (30th Cong., First. Sess., Ex. Doc. No. 41, pp. 1-230, 1848). This same report also contains: Appendix No. 6. Notes of Lieut. J. W. Abert, pp. 386-414, and Report of Lieut. J. W. Abert of His Examination of New Mexico in the Years 1846-1847, pp. 417-546.

1850. George Archibald McCall (1802-1868).

As inspector of army posts, Colonel McCall left San Antonio, Texas, late in 1849 and went west to the Rio Grande, from Devil River, following approximately the line of the present Southern Pacific Railroad through the Davis Mountains to El Paso, which was reached in March, 1850. The Rio Grande was followed up to Santa Fe, which was reached in late March or early April. Staying in northern New Mexico all summer, he made Santa Fe his base for trips into the neighboring mountains and in September went as far east as Las Vegas. The month of October was spent in the trip down the Rio Grande to El Paso. His main report was published as: *Some Remarks on the Habits, etc., of Birds Met With in Western Texas between San Antonio and the Rio Grande, and in New Mexico; With Descriptions of Several Species Believed to Have Been Hitherto Undescribed* (*Proc. Acad. Nat. Sci. Phila-*

delphia, pp. 213-224, 1851). He also published: Note on *Carpodacus frontalis* (Say) with Description of a New Species of the Same Genus from Santa Fe, New Mexico (Proc. Acad. Nat. Sci. Philadelphia, VI, p. 61, 1852).

1851. Samuel Washington Woodhouse (1821-1904).

When Captain Sitgreaves explored the Zuni and Colorado Rivers, Dr. Woodhouse accompanied his party as physician and naturalist. On his way to join the party Woodhouse left San Antonio, Texas, on May 7, 1851; reached the mouth of Devil River, May 26; crossed Texas to El Paso; and followed up the Rio Grande to Santa Fe. The expedition started August 15, from Santa Fe, on the route down the Rio Grande to the mouth of the Puerco, following up this stream to Laguna, thence to Acoma, Inscription Rock, and Zuni, which was reached September 1. Remaining there until September 24, the Sitgreaves party traveled down the Zuni and on September 25 crossed into Arizona. As this is the only trip Woodhouse made in New Mexico, all his New Mexico notes must refer to it. Many of the birds collected have been deposited in the museum of the Academy of Natural Sciences of Philadelphia. A short report on the collection was made by Woodhouse: Report on the Natural History of the Country Passed Over by the Exploring Expedition Under the Command of Brev. Capt. L. Sitgreaves, United States Topographical Engineer, during the Year 1851; in Sitgreaves' Exped. Zuni and Colo. Rivers, pp. 31-105, 1853.

1852-1858. Thomas Charlton Henry (died January 5, 1877).

For several years, at least from 1852 to 1858, Dr. T. C. Henry lived in New Mexico, and although a surgeon in the regular army, he found time to make large collections of birds. He was stationed at Fort Fillmore, August-December, 1852; Fort Webster, December, 1852, to early in 1854; and during the remaining four years made Fort Thorn his headquarters. All his specimens were sent to Washington, D. C., and are quite fully reported on by Baird in Volume IX of the Pacific Railroad Reports. In addition Dr. Henry himself published: Notes Derived from Observations Made on the Birds of New Mexico during the Years 1853 and 1854 (Proc. Acad. Nat. Sci., Philadelphia, pp. 306-317, 1855), and Catalogue of the Birds of New Mexico as Compiled from Notes and Observations Made while in that Territory, during a Residence of Six Years (Ibid., pp. 104-109, 1859).

1853. Caleb Burwell Rowan Kennerly (1830-1861).

Dr. Kennerly was attached as physician and naturalist to Lieutenant Whipple's expedition, which surveyed the route for a Pacific Railroad, near the thirty-fifth parallel. Kennerly did not join the party until they reached Albuquerque, but the naturalist, H. B. Möllhausen, accompanied Lieutenant Whipple, who left Fort Smith, Arkansas, July 14, 1853, and followed the general direction of the Canadian River across Oklahoma and Texas. The party entered New Mexico, September 20, on the south side of the Canadian River, which they left at this point, passing to the Pecos and crossing it September 27, at Anton Chico. The route thence led to Galisteo, October 1; to the Rio Grande at Pena Blanca, October 3; and down the Rio Grande to Albuquerque October 5.

Dr. Kennerly had accompanied Lieutenant Ives' party, which had come up the Rio Grande from El Paso and reached Albuquerque, October 6. All were at Albuquerque and vicinity to November 8. On that date Lieutenant Ives, with Kennerly in his party, went south to Isleta and thence westward, following exactly the present route of the Santa Fe Railroad. Both parties were together at Laguna, November 13; Inscription Rock, November 18; Zuni, November 20. Leaving Zuni November 28, they followed down the Zuni River and entered Arizona at Camp No. 72, November 28, 1853. Notes on the expedition's collection of data were published

in the Reports of Survey for a Railroad to the Pacific: Route Near the Thirty-fifth Parallel, Explored by Lieut. A. W. Whipple, Topographical Engineer, in 1853 and 1854—Report on the Zoology of the Expedition (IV, Part VI, pp. 1-17, 1856) and Report on the Birds Collected on the Route (X, Part VI, No. 3, pp. 19-35, 1859). Notes on some of the specimens had been previously published by S. F. Baird as: Descriptions of New Birds Collected between Albuquerque, N. M., and San Francisco, California, during the Winter of 1853-54, by Dr. C. B. R. Kennerly and H. B. Möllhausen, naturalists attached to the survey of the Pacific R. R. route under Lt. A. W. Whipple (Proc. Acad. Nat. Sci. Philadelphia, pp. 118-120, 1854).

1854. Adolphus L. Heermann (1818?-1865).

Most of Dr. Heermann's ornithological work was done in California, where he spent nearly three years (1849-1852), collecting some twelve hundred birds, which he described on his return to Philadelphia. Upon the organization of the Pacific Railroad survey parties (1853) he went back to California by way of the Isthmus, and served as surgeon and naturalist to Lieutenant Williamson's party, in its survey of the 32d and 35th parallels in southern California.

His work in New Mexico followed (1854), when he was on the short exploration by Lieut. J. G. Parke, assistant to Lieutenant Williamson, near the 32d parallel from San Diego through Northern Mexico, Arizona, and New Mexico, terminating at San Antonio, Texas. The party, with a military escort of twenty-eight men, left San Diego, January 24, 1854, taking the southern route across the Coast Range and the Colorado desert to Fort Yuma at the junction of the Colorado and Gila; thence proceeding up the Gila to the Pima and Maricopa villages, February 13, and to Tucson, February 20, crossing into New Mexico in Hidalgo County about March 6. Following the emigrant road to Mesilla by way of the Rio Mimbres, they reached the neighborhood of Fort Webster, March 8; Cooke's Spring, March 10; Rio Grande near 32° 22', the boundary between the United States and Mexico, March 12; Mesilla Valley, near Dona Ana, and in sight of Fort Fillmore, March 13. Here, on March 17, wanting to examine a different local route for the railroad, Lieutenant Parke turned southwest to the gap between the Picacho and the Sierra Florida, returning to the Rio Grande and "the post" [Fort Fillmore], where the season's work ended, March 21; those of the party remaining with Lieutenant Parke, including Dr. Heermann, proceeding down the Rio Grande to El Paso and San Antonio, Texas (Pacific Railroad reports, Vol. II, Report of Lieutenant Parke, pp. 2-15).

Heermann's work in New Mexico was, therefore, confined to the southern and largely southwestern part of the State, in what are now the southwestern tier of counties—Hidalgo, Luna, and Dona Ana. His New Mexico notes were published in the Reports of a Survey for a Railroad to the Pacific, Route near the Thirty-second Parallel (Vol. X, Zoological Report, Part III, No. 1, pp. 9-22, pls. 3, 1859; No. 2, pp. 29-80, pls. 7). The itinerary of the trip is given in Vol. II, Report of Lieutenant Parke, pp. 2-15. (See Witmer Stone, *Cassinia*, Vol. XI, pp. 1-6, 1907).

1854. John Pope (1822-1892).

Captain Pope and a party of about 75 men started from Dona Ana on February 12, 1854 and journeyed slowly eastward just north of the southern boundary of New Mexico. They left the Hueco Mountains February 22, the Cornudas Mountains February 25, and immediately crossed into Texas, passing around the south end of the Guadalupe Mountains February 28; then entering the valley of Delaware Creek, they followed it to its junction with the Pecos in New Mexico, arriving there March 8 and remaining until March 19, when they went down the Pecos, crossing into Texas the same day.

A few men under the command of Captain Taplin left the main party at the mouth of Delaware Creek, March 9, 1854, and proceeding east and a little north crossed the boundary line into Texas, March 11, 1854, about 20 miles north of the southeastern corner of New Mexico, continuing thence east to the headwaters of the Colorado River, which they struck at a place about 30 miles northwest of the present town of Big Spring. On the general map of the Pacific Railroad Survey routes, this route traveled by Captain Taplin is marked as made by Lieutenant Gerrard who was sent a few days later, April 4-11, to make a topographical survey of the route. This expedition was accompanied, at least part of the way, by the accomplished ornithologist, Dr. T. C. Henry, and when the specimens of birds collected by Captain Pope's expedition were sent to Washington they were supplemented by several hundred specimens collected in New Mexico by Dr. Henry, making one of the largest bird collections secured during the Pacific Railroad surveys. Captain Pope's report is entitled: Report of Exploration of a Route for the Pacific Railroad near the Thirty-second Parallel of North Latitude from the Red River to the Rio Grande (Rep. Surv. R. R. Pac. II. Rep. Bt. Capt. John Pope, etc., pp. 1-185, 1854). The bird notes are found in the "Diary of the Expedition," by J. H. Byrne, pp. 50-93.

1858-1860. William Wallace Anderson (1824-1911).

As a surgeon in the regular army Dr. Anderson was stationed from 1858 to 1860 at Camp Burgwyn, whence he sent two large collections of bird skins to the Smithsonian Institution.

1864. Elliott Coues (1842-1899).

On his way to Arizona in 1864 Dr. Coues entered New Mexico from Colorado at Los Pinos by Raton Pass, going south to Albuquerque, near where he collected specimens in June. Going west over the route now followed by the Santa Fe Railroad he collected near Fort Wingate, June 28-July 8, soon after which he passed into Arizona. The specimens collected were sent to the National Museum and some of the records were published as: Ornithology of a Prairie Journey, and Notes on the Birds of Arizona (Ibis, pp. 157-165, 1865, in which the New Mexico part occurs on pages 158-160).

1873-1883. Henry Wetherbee Henshaw (1850-).

In connection with the Geographical and Geological Explorations and Surveys west of the one-hundredth meridian, Henshaw after six weeks of collecting in the San Luis Valley, Colorado, entered New Mexico, July 2, 1873, along the Rio Grande. Ten days were spent on the Rio Grande. Subsequently Fort Wingate was reached, July 12. A week was occupied in collecting in the neighborhood of the fort, when the party moved on down the Rio Puerco into Arizona, remaining in that State until early in October when they recrossed into New Mexico and journeyed up the Gila to near the sources of Diamond Creek and the Mimbres, thence going northward until November 27, when they reached Fort Wingate, where they disbanded for the season. The report on the bird collections of this year was published in Report upon and List of Birds Collected by the Expedition for Geographical and Geological Explorations and Surveys West of the One-hundredth Meridian in 1873. Lieut. G. M. Wheeler, Corps of Engineers, in charge. (Rep. Orn. Specimens, 1871-1873, pp. 55-148, 1874, in which the New Mexico birds are treated on pages 95-148.)

The work of 1873 was continued in 1874 and the party, consisting of Henshaw, Dr. J. T. Rothrock, and J. M. Rutter, reached Santa Fe and collected specimens there for three weeks in June. They then traveled rapidly to Fort Wingate over the route followed the previous year, going to Arizona for the rest of the summer. The regular field work closed at Camp Apache the middle of October, but in Novem-

ber on the way back to Washington, D. C., Henshaw crossed New Mexico, going to Fort Craig on the Rio Grande, thence up the river to Albuquerque and Santa Fe, and by way of Raton Pass, to Pueblo, Colorado. Many notes were made of the birds seen on this trip and especially of the water birds along the Rio Grande. No special report was printed on the collections of this year, but they are included and specified in Wheeler's Rep. Geog. and Geol. Expl. and Surv. West 100th Mer., V, Chap. III, 1875, in which the bird notes occupy pages 133-507 under the heading: Report upon the Ornithological Collections Made in Portions of Nevada, Utah, California, Colorado, New Mexico, and Arizona, during the Years 1871, 1872, 1873, and 1874.

Between July 18 and October 28, 1883, Henshaw and Nelson made large collections in the mountains about 45 miles east of Santa Fe. Their headquarters were on the Pecos River at Willis, at an altitude of 7,800 feet. Their combined notes were published by Henshaw as: List of Birds Observed in Summer and Fall on the Upper Pecos River, New Mexico (Auk, II, pp. 326-333, 1885, and III, pp. 73-80, 1886). The same locality was visited in 1903 by Mr. and Mrs. Vernon Bailey and some of their records were published by Mrs. (F. M.) Bailey as: Additional Notes on the Birds of the Upper Pecos (Auk, XXI, pp. 349-363, 1904).

1874-1876. Charles Edward Howard Aiken (1850-).

The summer of 1874 was spent by Aiken in the San Luis Valley, Colorado, as a collector for the Wheeler Survey. He spent two weeks at Pagosa Springs, September 5-21, and during that time made a short trip across the line into New Mexico, to what he called the "Gallinas Mountains," but he probably did not reach the range 40 miles south of the border now known by that name. No separate report seems to have been made on the specimens collected in New Mexico. During May and June two years later Aiken crossed northwestern New Mexico from Raton Pass to Zuni, on his way from Colorado to Arizona, returning in September. Many birds were collected, which were reported upon in Vol. V, Chap. III, Zoology, Expl. and Surv. W. of the 100th Meridian, 1875.

1875-1876. Frank Stephens (1849-).

Stephens worked in New Mexico from March, 1875, to September, 1876. He entered the State by the Mosca Pass, Colorado, driving "through Taos, Santa Fe, Albuquerque, along the Rio Grande across to the Mimbres to Fort Bayard" doing a little bird collecting along the way. He did "scarcely any work in the plains," working "principally in the mountains north of Fort Bayard," and spending "a month or so on the Gila, 25 miles from Silver City in the spring of 1876." He published his records as: Notes on a Few Birds Observed in New Mexico and Arizona in 1876 (Bull. Nutt. Orn. Club, III, pp. 92-94, 1878), and Nesting of *Buteo zonocercus* in New Mexico (Ibid., IV, p. 189, 1879).

1882. Charles Foster Batchelder (1856-).

From December 4 to 23, 1882, Batchelder was at Las Vegas Hot Springs, New Mexico, and during this time made careful observations of the birds in the immediate vicinity of the Springs. His notes were published as: Winter Notes from New Mexico (Auk, II, pp. 121-128, 233-239, and 306, 1885).

1883-1884. Charles H. Marsh.

Daily lists of the birds seen in the immediate vicinity of Silver City from November, 1883, until June, 1884, were kept by Marsh. These lists were published as: Birds of Silver City (Orn. and Ool., IX, pp. 72-74, 126-127, 1884). In early Septem-

ber he made a trip to the Carolina Divide, about 20 miles distant, and reported the birds seen there and other records for Silver City as: Notes from Silver City, New Mexico (Orn. and Ool., X, pp. 3-4, 1885). Later he published in the same journal: Song of the White-rumped Shrike (X, page 111); Notes from Silver City, N. Mex. (pp. 147-149 and 163-165, and XI, pp. 124-125, 1886).

1884-1888. Robert Wilson Shufeldt (1850-).

While in the medical department of the United States Army, Dr. Shufeldt was stationed for a time at Fort Wingate, where he made observations and collections.

1886-1889. Alfred Webster Anthony (1865-).

Anthony lived at Apache Hills, a few miles south of Hachita, during February-October, 1886, and September-December, 1889. He made extensive explorations and collections not only in the plains region but also in the neighboring Big and Little Hatched Mountains. Most of his specimens are now in the Carnegie Museum at Pittsburgh, Pennsylvania. His records were published as: Birds of Southwestern New Mexico (Auk, IX, pp. 357-369, 1892).

1887. Barton Warren Evermann (1853-) and Oliver Peebles Jenkins (1850-).

While journeying from Indiana to Guaymas, Mexico, in 1887, Dr. Evermann and Professor Jenkins made notes of the birds seen the first week in July, when passing through New Mexico. These notes were published as: Ornithology from a Railroad Train (Orn. and Ool. XIII, pp. 65-67, 1888), and include notes from Raton Pass, Albuquerque, San Marcial, and Amarillo.

1889-1908, 1918, 1924. Vernon [Orlando] Bailey (1864-) and Mrs. Florence Merriam Bailey (1863-).

Vernon Bailey, of the Biological Survey, collected in the mountains in the vicinity of San Pedro, about thirty miles northeast of Albuquerque, New Mexico, from July 1 to 16, 1889; and from July 16 to 25, 1889, in the vicinity of Albuquerque. During late November and the first week in December, 1889, he collected at Deming and in the flat country surrounding it. In 1899, accompanied by Alexander Henry Higginson, he was at Portales, June 7, and Roswell, June 8-12, after which they made a wagon trip to Mount Capitan, camping at the base of the mountain at Las Palos, June 13-16, and climbing Mount Capitan, June 14. They returned over the same route to Roswell, June 17, and went thence to Carlsbad, June 18-20. Clouderoft, at 9,000 feet, near the summit of the Sacramento Mountains, was visited by Mr. and Mrs. Bailey by train from El Paso, May 28-June 2, 1900, and by Bailey and Hollister with camp outfit, September 7 and 8, 1902.

On July 19, 1901, Bailey entered New Mexico by train from Texas and went to Carlsbad, where he was joined by Mrs. Bailey, and worked in the vicinity until July 30. They then went by wagon up Dark Canyon and camped for a week high up in the Guadalupe Mountains five miles east of Queen, then two days at Queen and August 9-25 in Dog Canyon, the base camp being at 6,800 feet in Texas one-half mile south of the New Mexico line, from which three trips were made to McKittrick Canyon, one over night, August 20-21, for exploration and collecting. On August 25 they returned to New Mexico and during the next three days worked north about 20 miles along the main range, then turned east August 27 and reached Dark Canyon again at Moseby's Spring, returning to Carlsbad, August 29. They remained near Carlsbad until September 18, with a side trip, September 13-14, out 35 miles southeast onto the Staked Plains. Some of the records made near Carlsbad in September were published by F. M. Bailey as: An Irrigated Ranch in the Fall Migration (Condor, XII, pp. 161-163, 1910).

On September 2, 1902, Bailey, accompanied by Hollister, entered New Mexico from the south at the Salt Lakes of the western base of the Guadalupe Mountains and traveled by wagon almost due north across the flats and through the foothills up the valley of Pinon Creek to Weed in the Sacramento Mountains, reaching there September 5; thence proceeding to Mayhill September 6, Clouderoft September 7-9, Elk Springs and Mescalero September 10-12, and to Ruidoso September 12-15. On September 13, from the camp near Ruidoso he made a horseback trip to the top of Sierra Blanca, after which he went down Ruidoso Creek and the Hondo River, reaching Roswell, September 17.

In 1903 a full season was given by the Baileys to New Mexico. After collecting at Santa Rosa and vicinity from May 19 to June 9, 1903, where they were joined by Alfred Edward Weller, a temporary assistant who remained with them until they reached Taos, they started by wagon to the northeastward, collecting near Cuervo, June 9-14, camping near Montoya, June 14-20, and exploring to the top of the Staked Plains, 1,000 feet higher. Moving camp to a little north of Pajarito Creek on June 20, on June 22 they rode 12 miles northeast to the Canadian River, on June 23 proceeding north to the mouth of Cuervo Creek, then west to Cabra Springs, and thence north 15 miles, June 25, to the top of Mesa Yegua. They returned to Cabra Springs, June 28, west to Gallinas Springs, June 29, and by way of Casous and Anton Chico to La Cuesta, June 30, and on to Ribera, July 1. Some of the notes on the birds of the plains were published by F. M. Bailey as: Twelve Rock Wrens' Nests in New Mexico (Condor, VI, pp. 68-70, 1904); Scott Oriole, Gray Vireo, and Phoebe in Northeastern New Mexico (Auk, XXI, pp. 392-393, 1904); Additions to Mitchell's List of the Summer Birds of San Miguel County, New Mexico (Auk, XXI, pp. 443-449, 1904); Nesting Sites of the Desert Sparrow (Condor, VIII, pp. 111-112, 1906); The Yellow Pines of Mesa del Agua de la Yegua (Condor, XII, pp. 181-184, 1910); The Oasis of the Llano (Condor, XIII, pp. 43-46, 1911).

The Baileys' work in the Pecos Mountains began at Ribera, July 1-3, from which point the Pecos River was followed up to a camp between Rowe and Pecos City, where a night's trapping was done, July 3-4. Then the ridge at Glorieta was crossed and Santa Fe reached July 5. Returning to Glorieta, they collected there July 7-12,¹ and reaching the Pecos River at Pecos City followed the river up to its junction with the Rio Mora, where they collected at 8,000 feet, July 13-18. Camp was moved to one mile above Willis at 8,500 feet, and after collecting there until July 21, they exchanged their wagons for a pack outfit and made camp, July 21-August 7, at 11,000 feet, on the meadows near the head of Jack Creek. The next move was to the east base of Pecos Baldy near a lake at 11,600 feet, where collecting was done, August 7-17, covering the region about Pecos Baldy and the Truchas Peaks, a trip also being made by Bailey down the Rio Media on the Rio Grande slope, August 17.² After returning to the wagons at Willis for two days, they collected at the fork of the Pecos and Mora Rivers three days at a camp two miles above El Macho, August 21-24, and spent two nights trapping at the old camp ground between Pecos and Rowe, after which they made camp at Ribera, August 26, near Bernal, August 27, and the next day on the edge of Las Vegas, where they collected until September 1. Proceeding north they left Las Vegas September 1 and passed Sapello September 3, Penasco Blanco, Mora, and La Cueva, September 5, and Guadalupita, September 6. They went up Coyote Creek to Black Lake,

¹ The notes on the birds seen at Glorieta were published by F. M. Bailey as: Birds of the Cottonwood Groves (Condor, XIV, pp. 113-116, 1912).

² Some of the bird records from these mountains were published by F. M. Bailey as: Additional Notes on the Birds of the Upper Pecos (Auk, XXI, pp. 349-363, 1904); A Dusky Grouse and Her Brood in New Mexico (Condor, VI, pp. 87-89, 1904); Breeding Notes from New Mexico (Condor, VII, pp. 39-40, 1905); A Nest of *Empidonax difficilis* in New Mexico (Condor, VIII, p. 108, 1906); Notes from Northern New Mexico (Auk, XXII, pp. 316-318, 1905).

September 9, to the Moreno Valley at the west base of Agua Fria Mountain, September 10, and to the east side of Taos Pass, September 12-15, camping near Elizabethtown, September 15-20, when Bailey climbed Taos Mountain, September 17. On September 20 they turned back and crossed Taos Pass, reaching Taos, September 21, camping and exploring six miles north of Taos on Lucero Creek until October 1. On September 25 they went up Hondo Canyon and to the west base of Wheeler Peak. Leaving Taos on October 1, they reached Santa Fe, October 2, by way of Tres Piedras.

In 1904 the Baileys reached Taos on July 8 and remained collecting in the neighborhood until July 19, Bailey making a trip, July 17, up Lucero Creek to the top of the range at 12,700 feet, returning by way of Pueblo Creek. On July 19 they went up Hondo Canyon to Twining from where they proceeded with a pack outfit to the small lake above Twining at 11,200 feet. Working here until August 1, they made many trips to the top of Wheeler Peak and some of the highest of the neighboring peaks. Descending, they moved camp to the meadows two miles above Twining, at 10,700 feet, August 2-8. They were near the lower end of Hondo Canyon, at 8,200 feet, August 8-11; on the mesa above Hondo River west of Arroyo Seco, at 8,000 feet, August 12-14; near the mouth of Red River at 8,000 feet, August 15; to Red River Canyon, three miles above Questa at 8,200 feet, August 15-16; on Lost Trail Creek near Eagle Mine, seven miles north of the town of Red River, at 10,700 feet, August 16-18; then over the pass to Comanche Creek, a fork of Costilla River and down it to Costilla River on August 19. August 18 they went up Costilla River a dozen miles, and on August 20 Bailey made a horseback trip to the highest peak of the Culebras, 12,600 feet. After going down the Costilla River to the town of Costilla, August 25, they then went north into Colorado. Returning to New Mexico September 5, they followed up San Antonio River and camped at the west base of San Antonio Peak; going on to near Tusas September 6; near Hopewell (Good Hope) September 7-11, crossing here the main range of the San Juan Mountains at 10,000 feet; near Tierra Amarilla, September 12-13; Boulder Lake, September 14-16; Lake La Jara, September 16-19; Dulce, September 20-21; Horse Lake, September 22-24; near El Vado, September 25-26; Burford Lake,¹ September 26-October 3; west base of Gallinas Peak, October 3-4; and Gallina, October 5; making camp on Coyote Creek a few miles above its mouth. From here the Mesa Prieta was climbed October 9, 10,400 feet, and Coyote Creek was followed up to its head, October 10-11, after which the descent was made to Chama River, October 12; Abiquiu, October 13; Espanola, October 15; and Santa Clara, October 16-19, when work ended for the season.

In 1906 the Baileys started from Espanola, August 20, and went up Santa Clara Creek, spending the time to September 5 collecting at five camps at different altitudes, Bailey exploring to the top of Santa Clara Peak, 10,400 feet, September 4. Crossing the divide to the upper waters of San Antonio Creek at Valle Santa Rosa, they climbed Pelado Peak, September 6; going down San Antonio Creek and Jemez River to Jemez, September 9; San Isidro, September 11; Cabezon, September 12; Salazar, September 13; Juan Tafoya, September 14; Laguna, September 15-19; and Cubero, September 20. On September 21 Bailey climbed to the top of Mount Taylor, after which they returned to Cubero, going on to Acoma, September 23-24; Miller, September 25; Punta Malpais, September 28; Lathrop Spring, September 30; Quemado, October 1; Largo Canyon, October 2-5; climbing the Pinyon Mountain, October 3; reaching and working the west end of the Datil Mountains, October 5-8; going on to Fort Tularosa, October 9; Frisco, October

¹ Some of the records made at this lake were published by F. M. Bailey as: Wild Life of an Alkaline Lake (Auk, XXVII, pp. 418-427, 1910).

10; and Joseph, October 11-13. A trip was made to the top of the Tularosa Mountains, October 12; after which they went down San Francisco Canyon, October 13, reaching Alma October 15 and Mogollon October 16; crossing the ridge the next day to the upper part of Willow Creek (a prong of the Middle Gila), where they camped from October 17 to 29, Bailey climbing White Water Baldy, October 23. Descending the mountains they stopped at Mogollon, October 30; Glenwood, October 31-November 4; Cactus Flat, November 5; Cliff, November 6-8; and Mangos Valley, November 9; reaching Silver City, November 10, where work ended for the season. The bird notes from the last part of this trip, Willow Creek to Glenwood, were published by F. M. Bailey as: *A Drop of Four Thousand Feet* (Auk, XXVIII, pp. 219-225, 1911).

In 1907 the Baileys, on their way to California, passed through Tucumcari and El Paso, stopping at Deming, May 30-31, and at Lordsburg, June 1-3.

In 1908 Bailey went by train to Albuquerque, Belen, and Mountainair, July 28-29, and on July 30 climbed to the top of Manzano Peak. Returning by rail from Mountainair to San Marcial on July 31 he drove 19 miles toward Rosedale and returned to San Marcial, going by train to Mesilla Park, August 1. Remaining there over night he went the next day by train to El Paso, Deming, Silver City, and back to Deming. Leaving Deming by wagon, August 4, he went by way of Gage and Playas Lake to the Adobe Ranch in the Animas Valley, where, on August 6 he met Goldman and Birdseye, who had been collecting in the region for some weeks. After spending a week with them, during which time the Animas Mountains were explored and the Gray and Lang Ranches were visited, he left Goldman at the Lang Ranch, August 11, and, accompanied by Clarence Birdseye as far as Farmington, reached Hachita the next day by way of San Luis Pass, Dry Creek, and the Playas Valley, then going by train to Lordsburg, August 13, and by way of Deming to Silver City, August 14-18. Leaving Silver City by wagon, August 19, he was at the G. O. S. Ranch and Terry Canyon, August 20, and Rocky Creek, August 21-23; he climbed Quaking Asp Peak, August 23, and was at Diamond Creek, August 24; Old Fort Vincent, August 25; Beaver Lake, August 26-27; Elk Mountains, August 28-29; Negrito Creek, August 30; Reserve, August 31-September 2; San Francisco Mountains, September 3; and Luna, September 4-6, going thence into Arizona. Three weeks later he reentered New Mexico by the Zuni River and was at Ojo Caliente, September 21; Zuni, September 22; Gallup, September 23-27; Fort Defiance, Arizona, September 29; near Chuska Peak, September 30-October 1; Chuska Lakes, October 2-5; north end of Chuskas, October 6-11; making trips to the Tunicha Mountains, October 8; and to Crystal, October 9 and 11. Going down Tunicha Creek, October 12, he was at Chaco River, October 13; Fruitland, October 14-18; Farmington, October 19; Largo, October 20; he went up Canyon Largo, October 12, and was at Pueblo Bonito, October 23; Bluewater, October 25; San Rafael, October 26-November 1; then going by train to Kettner, November 2, by way of Thoreau and over the divide to the head of Bluewater River. He went by train to Engle, November 6, visiting the reclamation works at Elephant Butte and then going by train to Mesilla, November 7-9, during which time a trip was made to the Organ Mountains.

[In 1918 Bailey entered northeastern New Mexico from Texas on the Colorado and Southern Railway and was at Clayton, Union County, from April 2 to 5, making a trip by automobile to Clapham on Major Longs Creek, about 25 miles southwest of Clayton on April 5, and leaving for Colorado by train that night.

In 1924 he entered New Mexico from Pecos, Texas, and went up the Pecos Valley by train to Carlsbad on March 10, the next day driving out to the Carlsbad

Cave, 26 miles southwest of Carlsbad and 13 miles north of the Texas line, where he explored the cave and surrounding country, including many other caves and canyons until leaving Carlsbad again for the east on May 10, via Roswell and Portales.]¹

1889-1890. Robert W. Barrell.

When living at Cooney in 1889 and at Carlisle in 1890, Barrell sent to the Biological Survey lists of breeding birds, together with schedules of migration dates for the spring and fall of 1889 from Cooney, and for the spring of 1890 from Carlisle.

1889-1924. Clinton Hart Merriam (1855-).

Doctor Merriam, in passing through New Mexico at various times on his way to the field in other States, recorded the birds seen at different points, notably: Along the Santa Fe Railroad, Raton to Las Vegas, July 24, 1889; Las Vegas Hot Springs, July 25, 1889; Puerco Valley, July 26, 1889, and December 20, 1919; along the Southern Pacific Railroad west of El Paso, October 25, 1894; along the Santa Fe Railroad, west of Laguna, July 1, 1896; Espanola, July 15, 1896; 20 miles south of Raton, May 5, 1903; Santa Fe (city), May 6, 1903; along the Santa Fe Railroad west of Albuquerque, November 29, 1923; along the Santa Fe Railroad, July 13, 1924.

1890. Elmer Philo Blinn (1850-1915).

In 1890 a list of the breeding birds of Chloride was sent to the Biological Survey by Dr. Blinn.

1890. Henry Kelso Coale (1858-1927).

During a trip made in 1890, Coale visited Fort Union, March 22, and Fort Marcy, March 25. His bird observations were published as part of an article on, Ornithological Notes on a Flying Trip Through Kansas, New Mexico, Arizona: and Texas (*Auk*, XI, pp. 215-222, 1894).

1892. Basil Hicks Dutcher (1871-1922).

Colonel Dutcher collected for the Biological Survey at Carlsbad, September 12-24, 1892.

1892-1894. Albert Kenrick Fisher (1856-).

Dr. Fisher, of the Biological Survey, collected at Fort Wingate, July 2-7, 1892, and at Silver City, June 27-July 12, 1894. During part of the latter time he visited the foothills of the Pinos Altos Mountains, about eight miles north of Silver City.

1892-1894. John Alden Loring (1871-).

Loring, when in the Biological Survey, stopped at Santa Fe, July 9, 1892, and collected, July 12-14, at Tres Piedras. In 1893 he made a midwinter trip through the central part of the State, spending December 3-9 at Aztec in the extreme northwestern corner and December 10-12 near by at La Plata. He went by rail to Chama, December 19-29, and thence by rail to the Rio Grande Valley where he collected at Espanola, December 30, 1893-January 9, 1894; Lamy, January 11; Albuquerque, January 11-19; Bernalillo, January 18; Belen, January 20-21; Socorro, January 22-23; San Marcial, January 24; and Las Cruces, January 25.

¹ Bird notes of this trip were published in *Animal Life of the Carlsbad Cavern*, by Vernon Bailey, Williams and Wilkins Co., Baltimore, 1928.

1892-1893. Edgar Alexander Mearns (1856-1916).

While connected with the Mexican Boundary Survey, Dr. Mearns during the summers of 1892 and 1893 traversed the entire length of the southern boundary of New Mexico. Many birds were collected, part of the specimens being taken in New Mexico and the rest on the Mexican side of the line, but seldom more than five miles from New Mexico and usually within a mile of the boundary. Use has been made of all of Mearns' records but in each case there is an explicit statement as to which side of the line the specimen was taken. Most of these records have not been previously published. Mearns was assisted in his collecting by Frank Xavier Holzner. The boundary survey began at the west bank of the Rio Grande, where collecting commenced February 17, 1892. The principal collecting stations were: Monument No. 15, about 50 miles west of the Rio Grande, March 20-April 7; Palomas Lakes, Chihuahua, one mile south of Monument No. 21, April 7-15; Carrizalillo Springs, N. Mex., near Monument No. 33, April 15-22; Monument No. 40, where the boundary line turns south near longitude 108° W., April 22-May 15; Big Hatchet Mountains, N. Mex., part of May 18-25; Mosquito Springs, Chihuahua, near Monument No. 46, part of May 10-21; and Dog Spring, N. Mex., near Monument No. 55, where large collections were made at various times from May 21-June 13, 1892, and September 15-23, 1893; Whitewater, Chihuahua, a mile south of Monument No. 61, part of May 30-June 29, 1892, and part of September 10-23, 1893; San Luis Mountains, where the main camp on the east side was at San Francisco Canyon, five miles southwest of Monument No. 63, while the main camp on the west side was at San Luis Springs, now known as Lang's Ranch, on the New Mexico side of the line at Monument No. 66. Trips were made to various parts of the mountains and to the summits during part of June and July, 1892, and August 31-October 2, 1893; Cajon Bonito Creek, Chihuahua, head of the right fork, six miles south of Monument 67, part of July 1-24, 1892, and of September 8-28, 1893; Animas Valley at Monument 67 and Cloverdale, N. Mex., at the west side of the valley, six miles north of Monument 69. At the latter place collections were made July 14-18, 1892, while the Animas Valley was crossed seven times in July, 1892, and in August and October, 1893.

1893-1894. Ernest Thompson Seton (1860-).

From October 22, 1893, to February 5, 1894, Seton was riding the range in eastern Union County, hunting bobcats, wolves and coyotes, "with especial commission to destroy the Currumpa Pack of gray wolves for the L. V. Fitz-Randolph LF Ranch." During this time he incidentally collected birds and made field notes on about 100 species, working in the "Brakes of the Cimarron," and at Currumpa, Clayton, Perico, Clapham, and Penabetitos, in the drainage of the Canadian River.

1895-1897. Charles M. Barber.

In 1895 Barber sent the Biological Survey a report on the current spring bird arrivals at Halls Peak; and later, as a student at the New Mexico Agricultural College, collected in the vicinity of Mesilla Park, his specimens going to the museum of the college.

1896-1897. Sidney Stuart Wilson.

Wilson spent the summers of 1896 and 1897 at Fort Bayard. Part of his notes were published as: *Some Additional New Mexican Birds* (Auk, XVI, pp. 188-189, 1899).

1898. Walton Jungerich Mitchell (1877-).

Dr. Mitchell lived at Las Vegas from January to June, 1898, and made many trips after birds into the neighboring mountains. His observations cover a range of altitude of 6,000-12,000 feet and were published as: *The Summer Birds of San Miguel County, New Mexico* (Auk, XV, pp. 306-311, 1898). Much of this same district was visited in 1903 by Vernon and F. M. Bailey, and part of their observations were published by F. M. Bailey as: *Additions to Mitchell's List of the Summer Birds of San Miguel County, New Mexico* (Auk, XXI, pp. 443-449, 1904).

1899-1901. Francis Joseph Birtwell (1880-1901).

Birtwell, while a student at the University of New Mexico, Albuquerque, in 1899-1901, devoted much time to collecting and studying the birds of the State. Most of his specimens were taken at Willis and in the vicinity of Albuquerque. His collection was purchased by the Agricultural College of New Mexico, and now forms a part of their museum. Most of these specimens are recorded in Miss Fannie Ford's Preliminary List of Birds of New Mexico.

1900. Lynds Jones (1865-) and William Leon Dawson (1873-1928).

Jones and Dawson passed through New Mexico on the Santa Fe Railroad June 30-July 2, 1900, and in addition to the birds seen from the train, spent a day making observations at Thornton on the Rio Grande. Their notes were published as part of *A Summer Reconnaissance in the West* (The Wilson Bulletin, No. 33, pp. 1-39, 1900).

1901. Louis Agassiz Fuertes (1874-1927).

Fuertes, on his way east from Texas, stopped at Carlsbad, joining the Baileys, August 6, 1901, in camp near Queen in the Guadalupe Mountains. On August 9, camp was moved to the head of Dog Canyon near the Texas and New Mexico line, from which trips were made on both sides of the State line from McKittrick Canyon north. Fuertes was engaged in collecting and sketching birds until August 14, when he returned to Carlsbad.

1902-1903. James Hamilton Gaut (1879-1914).

Gaut, when a member of the Biological Survey, began work at Roswell, New Mexico, September 10, and collected there until September 18, most of the time in cooperation with Ned Hollister, whom he accompanied on the trip from Roswell, by way of Fort Sumner, to Santa Rosa, which was reached September 27. Here he remained until October 11, when he went by rail to Corona, and collected there two weeks, during which time he made a trip through the whole length of the Gallo Canyon to a point about 40 miles to the southeast of Corona. Going by train to Carrizozo, he collected there October 28-November 2, when he went by train to Tularosa and spent a month investigating the foothills of the Sacramento Mountains to the east and the flat country for 10 miles to the north and south and 20 miles to the west. On December 3 he drove north 12 miles and on December 4, 25 miles northwest across the flat area to the Mal Pais country, continuing the next day to the salt flats; on December 6 he crossed the San Andres Mountains at 5,100 feet on the San Marcial road, and December 6-10 collected on the west slope of Salinas Peak, and, December 11-20, on the north slope. Sheep Mountain was visited December 21, and the Mal Pais Spring, December 22, after which he returned to Tularosa. Then going by train to Jarilla, he examined the Jarilla Hills January 1-5, 1903. Returning to Tularosa on January 9, he started for the San Andres Range by wagon across the flats, and on January 11 began collecting, working on the east slopes from about the middle part of the range due west of Alamogordo to the

southern end, and so south to Gold Camp, January 23. The next day he went to Organ City, and collected January 25–February 1 in the Organ Range and on the flats east to Parker Lake.

After a few months' work in other States, collecting was resumed in New Mexico and the time from June 24 to August 23 was spent in the Capitan Mountains. A ring of eight camps was occupied extending around the base of the mountains from the southwestern side to the southeastern and finally to the northwestern side. These camps were at 6,000–9,000 feet and excursions were made to the summits of the range. The Jicarilla Mountains were worked August 28–September 21, in the foothills and to the summits. Ancho in the northwestern foothills at 6,000 feet was visited September 22–25. The examination of the Mesa Jumanes began September 27 in the southern part, and was continued September 28–29, at the ruins of Gran Quivera, and in the northern part, September 30–October 2. The next three months to December 22 were spent in the Manzano Mountains, which were worked at the south end, along the foothills of the eastern slope and at the north end, with frequent excursions to the summits. At the conclusion of this trip a few days were spent in the Sandia Mountains, December 29, 1903–January 1, 1904.

1902 and 1905. Ned Hollister (1876–1924).

In the fall of 1902, when connected with the Biological Survey, Hollister entered New Mexico from Texas and went by wagon from Roswell to Santa Rosa, being at Roswell September 18, reaching Fort Sumner September 22, and Santa Rosa, September 26.

In 1905 he began work at Wingate June 18, and collected here and at Fort Wingate until June 29, extending his work into the pine-covered hills to the south. A week was spent at Gallup, July 2–8, when he went by train to Grant, and after spending four days there he went by wagon up the Zuni Canyon, reaching his base camp at Agua Fria Spring at 8,000 feet, seven miles south of Copperton. He spent eight days, July 17–24, here, working the immediate vicinity of the camp, then returned for eight days more at Grant and went on by train to Laguna. Here work was carried on in the valley for nine days after which he camped from August 13–18 in the San Mateo Mountains at 8,750 feet, 10 miles northwest of Seboyeta, from which the upper parts of the mountains were examined and Mount Taylor climbed. Work in the valley of the San Jose River was continued at Isleta, August 24–30, and then transferred to the valley of the Puerco River near the town of Rio Puerco, September 2–9. A wagon trip followed, leaving Laguna September 15 and traveling by way of El Rio, Cerro Verde, over the Mesa Gallinas, September 17, to Burley, September 19–20, the foot of Jara Peak near Riley, September 22–24, after which he worked from a camp in the Bear Spring Mountains about 12 miles northwest of Magdalena, September 26–October 1; going on to the Datil Mountains, October 6–13, and working from a camp at 9,000 feet, 12 miles northwest of Datil itself, where collections were made October 15–16. Thence the northern part of San Augustine Plain was crossed and the Gallina Mountains worked October 19–23, after which the route was retraced to Magdalena, where the field season was concluded October 25.

1903. Arthur Holmes Howell (1872–).

Howell, of the Biological Survey, made a short trip in the fall of 1903 through the extreme northeastern corner of New Mexico. Entering at Texline, July 29, he left there August 8 by train for Clayton; on August 10 he visited Rabbit Ear Mountain and Apache Canyon, collecting at the latter place August 10–12, camping August 13 at Perico Arroyo, 18 miles west of Clayton, reaching Sierra Grande,

August 15, and camping near its southeastern base. Collecting on the mountain August 17-21, he went nearly to the summit, August 20. Leaving Sierra Grande August 22, he drove to Folsom and collected in this neighborhood for two weeks, visiting Emery Peak August 27-28 and Capulin Mountain August 29; he went to Oak Canyon, five miles north of Folsom, August 31, and remained there until September 5. Then, returning to Folsom, on September 7, he drove about 14 miles northwest to Bear Canyon, staying there until September 12, when after a few days collecting near Trinidad, Colorado, he entered New Mexico again at Long Canyon, near Martinsen, September 17. Leaving the canyon September 19, he went to Catskill and the same day to Road Canyon; he left Road Canyon, September 21, camping that night in the Vermejo Valley, three miles above Vermejo; the next day he continued up the valley to Pena Flor, where he turned up Indian or Gold Creek and camped about five miles above its mouth. He remained there three nights and on September 25 climbed the additional 1,000 feet to the top of Costilla Pass and spent two days at about 10,000 feet, four miles north of the head of the Rito Ricardo. Starting back September 27, he retraced his course to Beal in the Vermejo Valley, reaching Catskill September 28, and three days later returning to Trinidad, Colorado.

1903-1904. McClure Surber.

Surber collected for the Biological Survey at Twining October 7-26 and December 14, 1903; Hondo Creek, January 4-19, 1904; Arroyo Seco, January 19-February 8; Cieneguilla, February 12-April 3; Rinconada, April 14-June 5; Espanola, June 11-25.

1903-1905. John Townsend Sharpless Hunn.

Hunn collected during parts of two years within a radius of 10 miles of Silver City, the period dating from the first of September to the sixth of May. His records are published as: Notes on Birds of Silver City, New Mexico (Auk, pp. 418-425, 1906).

1905-1911. William Harry Bergtold (1865-).

During several seasons, Dr. Bergtold spent much of October in southwestern New Mexico, covering the headwaters of the Gila River. In addition to sending many manuscript notes to the Biological Survey he published: October Birds of the Headwaters of the Gila River, New Mexico (Auk, XXIX, pp. 327-336, 1912).

1905. James Stokley Ligon (1879-).

During the summer of 1913, Ligon, then in the Biological Survey, made a horse-back trip for the purpose of studying the breeding waterfowl of New Mexico. He was near Chloride June 1-2; Monument Pass in the Black Range June 3; Haut Creek, June 4; East Gila and Beaver Creek, June 5; V + T Ranch, June 6; Chloride, June 8; near Cuchillo, June 10; Palomas Spring, June 11; Jornada Valley near Cutter, June 12; crossed the San Andres Mountains, June 13; Salt Flats, June 14; Mal Pais, June 15; Tularosa, June 16; Clouderoft, June 17; James Canyon, June 18; Mayhill, June 19; Lower Penasco, June 20; Hope, June 21; Artesia, June 22; Lakewood, June 23-24; Lake Arthur, June 25; Dexter, June 26; Roswell, June 27; Salt Creek, June 28; Fort Sumner, July 1; Santa Rosa, July 3-7; Anton Chico, July 8; San Miguel, July 9; Glorieta, July 10; Santa Fe, July 11; Espanola, July 13; Abiquiu, July 14; Lake Burford, July 17-23; Boulder Lake, July 2-4; Lumberton, July 25; Horse Lake, July 26-28; Lake Burford, July 29-August 2; Boulder Lake, August 3-4; Lumberton, August 5-6; Dulce Lake, August 7; Lumberton, August

8; and Lake Burford, August 9-12, when he returned to Chloride by way of the continental divide of western New Mexico.

Several other trips were taken by Ligon to different sections of the State when special attention was given to birds. June 20 to July 19, 1919, he went with pack outfit from Taos to Glorieta, Sangre de Cristo Range, working the Little Rio Grande, Pot Creek, Pueblo River, Santa Barbara River, Truchas Peaks, Pecos Baldly and the Upper Pecos River. June 6 to June 19, 1920, he went by automobile from Silver City to Mexican boundary and return, observations being made especially at Cow Springs, Hachita, Walnut Wells, San Luis Pass, Animas Valley, Animas Mountains, San Simon Marshes (north of Rodeo), and Burro Mountains. A large part of July and August, 1920, he was exploring with a pack outfit, covering all of the Black Range from Chloride to Hillsboro and Main, Middle, and South Diamond Creeks, Black Canyon, Pinos Altos Mountains, West and Middle Forks of Gila River, and Taylor Creek. May 27 to June 22, 1924, he went by automobile from Albuquerque over much of eastern New Mexico, from Vaughn and the Lower Pecos Valley to Carlsbad, thence eastward to Lovington and north to Clovis, Tucumcari, Nara Visa, Clayton, David, Albert, Springer, Cimarron, Wheeler Peak, Taos, and the Rio Grande Valley back to Albuquerque.

In addition to the records and specimens obtained on the above trips Ligon sent to the Biological Survey a report on the fall migration of 1905 near Engle, and has furnished a large number of notes on the migration, distribution, and breeding of New Mexico birds, gathered incidentally from 1914 to 1928 while engaged in other work throughout the State.

His published notes are: Nesting of the Great-tailed Grackle in New Mexico (Condor, XXVIII, pp. 93-94, 1926); Habits of the Spotted Owl *Syrnium occidentale* (Auk, XLIII, pp. 421-429, 3 pls., 1926); Wild Life in New Mexico: Its Conservation and Management, 1927.

1907. Marshall French Gilman (1871-).

For seven months, February 1 to September 1, Gilman lived at Shiprock Agency on the San Juan River in extreme northwestern New Mexico. In July five days were spent in the Chuska Mountains thirty-five miles to the south. A list of the birds seen at both places was printed as: Birds on the Navajo Reservation in New Mexico (Condor, X, pp. 146-151, 1908).

1908. Clarence Birdseye (1876-).

Most of the season of 1908 Birdseye was with either Major Goldman or Vernon Bailey, of the Biological Survey, but October 14-November 14 he collected by himself near Farmington, and November 14-20, at Blanco.

1908-1909. Edward Alphonso Goldman (1873-).

In 1908 Major Goldman of the Biological Survey arrived by rail at Hachita July 13, and collected in the vicinity of the town until July 18, then going by wagon 16 miles south to Hatchet Ranch, which was used as the base camp from which to work the Big Hatchet Mountains during the next week. Returning to Hachita, on July 26, he traveled by wagon 18 miles southwest to Davenport Spring by way of Hachita Pass and Livermore Spring, 10 miles from Hachita, continuing the next day in the same general direction across the low hills forming the north end of the Animas Range, and then turning south to Adobe Ranch. On July 28 he moved 3 miles south to the mouth of Indian Canyon, called also Animas Creek, and for 12 days used that as a base camp from which to work the northern and northeastern slopes of the Animas Mountains. Returning to Adobe Ranch August 9, he went south 18 miles to Gray Ranch and the next day 18 miles south to Lang Ranch,

also called San Luis Springs, which was the base camp for the following nine days while work was done in the San Luis Mountains, both sides of the International Boundary. Leaving there August 19, he went north to San Luis Pass, thence east through the pass and on to Deer Creek just south of the south end of Playas Valley. The next day he went north along the bottom of the valley to La Cienega Ranch, and the following day passed out of the valley through the low gap at the north end of the Hachita Mountains and on to Hachita, going from there by train to Deming. Field work began at Deming August 26, and continued in this immediate vicinity to September 10, with a side trip September 6-8 to the Florida Mountains, preceded by a two days' trip to the Little Florida Mountains.

Leaving Deming September 11, he traveled by wagon, crossing the Mimbres at the settlement called Rio Mimbres, passing Faywood and camping September 14, three miles west of Silver City. Leaving there September 15 he went 15 miles southwest to Leopold, and September 16, went 5 miles further, to the northeast base of the Burro Mountains, from which these mountains were worked. Returning September 20 to Tyrone, after one day's work he traveled northwest down the Mangos Valley for 12 miles, turned west for 15 miles and, after camping near the summit of a northern spur of the Burro Mountains, crossed the range the following day and traveled down Swan Canyon to Redrock on the Gila River, collecting there for nine days, to October 3. Then the route was retraced to the Mangos Valley and the valley traversed to the northwest, the Gila River being reached at the town of Gila, October 5. Collecting here for a week, on October 12 he moved 28 miles up Duck Creek to Cactus Flat and worked there two days, then crossing the divide 6 miles to Dry Creek and collecting for two days 6 miles above its mouth. On October 16 he descended 6 miles to Pleasanton on the San Francisco River, and on October 18 went to Alma; on October 20 starting into the Mogollon Mountains to the eastward, camping that night 10 miles from Alma at 7,000 feet, and moving on the next day 18 miles to a camp in the mountains at 8,500 feet, which was used as a base camp for the next week while excursions were made into the higher parts of the Mogollon Mountains. Returning on October 30 to Mogollon, after one day there he closed the work in New Mexico for the season.

The following year he reached Thoreau, N. Mex., June 9, 1909, and on June 12 left over the Zuni Mountain Railroad for Kettner, 16 miles south. The next day he went by wagon 12 miles southeast to McGaffy's Camp and remained there June 14-19, collecting to the top of Bear Ridge, about 9,000 feet; i. e., he collected from 8,100-9,000 feet. On June 20 he moved five miles eastward to Whitesides Camp, near Mount Sedgwick and during June 20-25 collected from his camp to the top of the mountain, 9,350 feet. Returning June 25 to McGaffy's Camp he left the mountains the next day for Thoreau, so leaving New Mexico. He returned August 11, 1909, to Socorro on the Rio Grande, and made that place his base camp for two weeks. On August 18-19 a trip was made to Ojo de la Parida, 10 miles to the northeast, the rest of the time being spent in collecting in the immediate vicinity of the town. On August 26 he left Socorro and traveled by wagon through the Socorro Mountains and around the east side of the Magdalena Mountains to the town of Magdalena. Returning the next day to the east base of the Magdalenas he established a base camp at the mouth of Water Canyon, 5,500 feet, about 15 miles southeast of Magdalena. From there the Magdalena Mountains were worked to the summit of the ridge, 10,000 feet, by way of Water and Copper Canyons. On September 5, he returned to Magdalena and September 9 went by wagon 23 miles southwest to Monica Springs, which was his base camp until September 26. On September 10 and 11 trips were made up Monica Canyon to the summit of the range at 9,800 feet, and on September 12-13 to Indian Butte. September 15

a trip was made 12 miles northwest to the bottom of the San Augustine Plain at 6,800-7,000 feet, the next eleven days being spent in the parts of the San Augustine Plain contiguous to Monica Spring. Leaving Monica Spring September 26, he made camp that night at Point of Rocks in San Augustine Plain, 15 miles southwest of Monica Spring, and the next night on the Rio Alamosa at the mouth of Limestone Canyon, 15 miles south of Point of Rocks, and 15 miles north of Ojo Caliente, where collections were made for three days. Leaving here September 30 he traveled southward about 35 miles to Fair View by way of Ojo Caliente. Returning to Ojo Caliente, October 2, the following day he went on 6 miles to the mouth of San Mateo Canyon, camping 2 miles above its mouth. San Mateo Peak, 10,000 feet, was climbed October 4, and again October 5, the summit being about 10 miles from camp. Returning to Fair View October 7, he remained there until October 21, except for the two days October 11-12, during which a trip was made 12 miles west to the summit of the Black Range. Leaving Fair View October 21, he went about 25 miles east to Cuchillo, on Cuchillo Creek, staying there two days; then he went south 18 miles to Las Palomas on the Rio Grande and worked there four days, going, October 29, 30 miles southwest to Hillsboro and, November 1, 13 miles west to Kingston at the base of the Mimbres Range. During five days spent here the slopes of this range were explored and Mount Sawyer, 10,000 feet, the highest point in the range near here, was climbed. On November 8 he returned to Hillsboro and went 18 miles south to Lake Valley, working in the neighborhood for six days, when on November 15, he proceeded by rail to Rincon and the next day by team 20 miles up the valley of the Rio Grande to Garfield. This trip was retraced November 22 to Rincon, thence by train to Las Cruces, where collections were made to November 28.

1909. Morris Miller Green (1870-).

In 1909 Green spent 10 days, July 23-August 1, at Clouderoft and sent to the Biological Survey a full report on the birds observed.

1910. Junius Henderson (1865-).

In August, 1910, Judge Henderson visited the Tewa Indians on the Rio Frijoles about 35 miles northwest of Santa Fe, and though primarily occupied with other branches of science made some observations on birds which are incorporated in his report: Junius Henderson and John P. Harrington, *Ethnozoology of the Tewa Indians* (Bull. 56, Bureau of American Ethnology, Washington, pp. 1-76, 1914. Birds, pp. 33-46). Most of these notes were published in 1911 from Henderson's manuscript report by Miss Ford in her "Preliminary List of Birds of New Mexico."

1910-1911. Ned Dearborn (1865-).

When in the Biological Survey, Dr. Dearborn visited the Pecos National Forest (10-15 miles northeast of Santa Fe), July 13-18, 1910; Carlsbad August 1-14, 1910; Sawyer, August 6-17, 1911; Encino, August 19-26, 1911.

1911. Miss Fannie Ford (Mrs. Arthur Sloan) (1882-).

The first State list of the birds of New Mexico was published by Miss Ford under the title of Preliminary List of Birds of New Mexico. (Report No. I, Conservation and Natural Resources Commission of New Mexico, pp. 17-63, 1911).

In addition to her own personal bird observations made in the vicinity of Mesilla, Miss Ford incorporated an abstract of previously published notes by other collectors and a large number of hitherto unpublished records taken from the manu-

script notes of F. J. Birtwell and from the data on the species of birds in the Museum of the New Mexico Agricultural College at Mesilla. The latter were collected largely by Charles M. Barber, who was a student at the college about 1897 and collected near Mesilla, and by O. B. Metcalfe, who graduated from the college in 1903 and collected both at Mesilla and in the Mogollon Mountains.

1911. Aldo Leopold (1886-).

Inspection trips for the Forest Service were made by Leopold from Albuquerque in 1911-1913, covering the whole of the Carson National Forest, and 1914-1924, covering all the National Forests of Arizona and New Mexico. The Rio Grande Valley from Santa Fe to Socorro was constantly traveled, especially during the fall hunting season.

Many of the bird notes made on these trips have been published in the *Condor*: Do Purple Martins Inhabit Bird Boxes in the West? (*Condor*, XX, p. 93, 1918); Notes on Red-headed Woodpecker and Jack Snipe in New Mexico (*Condor*, XXI, p. 40, 1919); Notes on the Behavior of Pintail Ducks in a Hailstorm (*Condor*, XXI, p. 87, 1919); Relative Abundance of Ducks in the Rio Grande Valley (*Condor*, XXI, p. 122, 1919); Notes on the Weights and Plumages of Ducks in New Mexico (*Condor*, XXI, pp. 128-129, 1919); Are the Red-headed Woodpeckers Moving West? (*Condor*, XX, p. 122); A Breeding Record for the Red-headed Woodpecker in New Mexico (*Condor*, XXI, pp. 173-174, 1919); Differential Sex Migration of Mallards in New Mexico (*Condor*, XXI, pp. 182-183, 1919); Range of the Magpie in New Mexico (*Condor*, XXII, p. 112, 1920); Further Notes on Differential Sex Migration (*Condor*, XXII, p. 156, 1920); A Hunter's Notes on Doves in the Rio Grande Valley (*Condor*, XXIII, p. 19, 1921); Weights and Plumages of Ducks in the Rio Grande Valley (*Condor*, XXIII, p. 85, 1921); Roadrunner Caught in the Act (*Condor*, XXIV, p. 183, 1922); The Following Habit in Hawks and Owls (*Condor*, XXV, p. 180, 1923); Coot Caught by Turtle (*Condor*, XXVI, p. 226, 1924); A Seven-Year Duck Census of the Middle Rio Grande Valley (*Condor*, XXVII, p. 8, 1925).

1912. Ralph Todd Kellogg (1876-).

Before going to New Mexico, Kellogg made a collection of the birds of Ohio, his native State, and since the spring of 1912 has been collecting in Grant County and the northwest corner of Luna County, mainly within a radius of 20 miles of Silver City.

His published records are: Rare Birds in Arizona and New Mexico (*Condor*, XXIV, pp. 29-30, 1922); Notes from Southwestern New Mexico (*Condor*, XXIV, p. 212, 1922); Notes from Silver City, New Mexico (*Condor*, XXV, p. 182, 1923).

1913. Edwin Richard Kalmbach (1884-).

Kalmbach, of the Biological Survey, spent some three months (July 28 to October 24, 1913) in Colfax County, near Koehler Junction, about twenty miles southwest of Raton. As he was working in cooperation with the Bureau of Entomology on the relation of birds to the New Mexico range caterpillar, most of his field work was done on the infested open plains, but occasional trips were made in the foothills, and side trips were made, on August 5 and 6, to the summit of Eagle Tail Mountain, ten miles east of camp, and another, August 27 to 31, to Cimarron, 28 miles to the southwest.

1913. Dayton Eugene Merrill (1884-).

Prof. Merrill collected for the Biological Survey part of the summer of 1913 at Mesilla Park and in the Organ Mountains. He also sent a list of all the species

known to breed in the vicinity of Mesilla Park, a report on the fall migration of 1913 at Mesilla Park, and many migration notes of previous years from the same place.

1914-1917. George Willett (1879-)

When a Reservation Inspector of the Biological Survey, Willett visited the Carlsbad Reservation from December 30, 1914, to January 20, 1915, during which time he made a trip to the Guadalupe Mountains, where he spent several days at an altitude of about 6,500 feet. A second visit of inspection was made February 21 to March 15, 1916, and a third, December 11 to 23, 1917. The Rio Grande Bird Reserve was also visited by Willett, November 23-December 9, 1916. Reports on the birds of the reservations were sent in to the Biological Survey after each visit of inspection.

1918. Jens Knudsen Jensen (1876-)

Since 1918, Jensen, who began collecting eggs when a high school boy in Denmark, has been collecting in northern Santa Fe County and has now about 9,000 eggs, of between 600 and 700 species (many foreign). Since 1922 he has banded about 1,500 birds of about 35 species. His published New Mexico records are: Northern Shrike (*Lanius borealis*) near Santa Fe, New Mexico (Auk, XL, p. 333, 1923); Notes on the Nesting Birds of Northern Santa Fe County, New Mexico (Auk, XL, pp. 452-469, 1923); The Great Grosbeak Year (Auk, XLI, pp. 569-572, 1924); Kingbird (*Tyrannus tyrannus*) in New Mexico (Auk, XLI, p. 603, 1924); Late Nesting of the Scaled Quail (Auk, XLII, pp. 129-130, 1925); English Sparrows and Robins (Auk, XLII, p. 591, 1925); Broad-tailed Hummingbirds Bathing (Auk, XLII, p. 588, 1925); English Sparrows and Robins (Auk, XLII, p. 591, 1925); Mountain Chickadee with an Adopted Family (Auk, XLII, p. 593, 1925); Red-tailed Hawk Killing Snakes (Auk, XLIII, pp. 368-369, 1926); Bird Banding (New Mexico Conservationist, March, 1928, pp. 5-6).

1918. [Frank] Alexander Wetmore (1886-)

When in the Biological Survey, Dr. Wetmore worked at Lake Burford (Stinking Lake) on the Jicarilla Apache Indian Reservation from May 23 to June 19, 1918, studying the waterfowl and other birds of that region. From here he returned to Chama and Albuquerque and then proceeded to Gallup, where he outfitted on June 25 for work in the Chuska Mountains. This range was entered from the west side and the period until July 4 was occupied in observing and collecting birds on the high plateau at the southern end of the mountains. Dr. Wetmore's Lake Burford notes were published as Observations on the Habits of Birds at Lake Burford, New Mexico (Auk, XXXVII, pp. 221-247; 393-412, 1920).

Additional Observers.

In addition to the preceding list of observers whose explorations, collections, publications, or special reports give them formal rank among the workers in New Mexico, there is a group of men enrolled with the Biological Survey migration and bird census observers who have supplied some of the State records given in the book.

Among these are Emerson Atkins, A. C. Cooper, F. J. Howarth, William M. Peterson, Lieut. Col. E. P. Rockhill, Stanley E. Piper, Harry E. Wilder, and others.

LOCALITIES VISITED BY OBSERVERS¹

By WELLS WOODBRIDGE COOKE

SO large a part of the bird observations in New Mexico has been made at places off the railroad and on few maps, that their location becomes a matter of great importance. In order to save space, each station is here definitely given once for all, instead of locating it each time it is referred to under the different species. The inclusive dates when each place was visited by the various collectors are given, thus saving needless repetition under the individual species.

Abiquiu, Rio Arriba County. On the Big Chama River, 15 miles from its mouth. Baileys, October 13, 1904; Ligon, July 14, 1913.

Acoma, Valencia County. Fourteen miles southwest of Laguna on the Atchison, Topeka, and Santa Fe Railroad; about 6,200 feet. One of the principal pueblos of the State. Baileys, September 23-25, 1906.

Adobe Ranch, Hidalgo County. At north base of Animas Peak, 15 miles from Arizona and 25 miles from Mexico; 5,100 feet. This was the base camp for the exploration of the Animas Mountains, q. v. Goldman, July 27, 1908; Bailey, August 6-9, 1908.

Agua Fria Spring (called Cold Springs on the Land Office map), Valencia County. Seven miles south of Copperton and 14 miles west of Grant on the Santa Fe Railroad; 8,000 feet. Base camp for work in the Zuni Mountains. Most of the specimens taken here are marked Copperton. Hollister, July 17-24, 1905.

Alamogordo, Otero County. A Station on the Southern Pacific Railroad, 85 miles northeast of El Paso; 4,300 feet. Baileys, May 28 and June 2, 1900; [Ligon, June 19 and October 22, 1917].

Alamosa River, Sierra County. A tributary of the Rio Grande from the west, with its mouth 45 miles north of Rincon. Goldman was at Ojo Caliente on this river September 30-October 3, 1909. Ligon was near Monticello about 20 miles from the mouth of the river, at 5,500 feet, the fall and winter of 1912-13.

Albert, Harding County. On Tequesquite Creek. [Ligon, June 12, 1924.]

Albuquerque, Bernalillo County. The principal city in New Mexico, on the Rio Grande; 5,500 feet. Visited by most of the early collectors: Emory, September 29, 1846; Abert, October 15 and 25, 1846; Kennerly, October 6-November 8, 1853; Coues, June, 1864; Henshaw, early July, 1873; Evermann and Jenkins, early July, 1887; Bailey, June 28-July 1 and July 16-25, 1889; Loring, January 11-19, 1894; Birtwell, 1899-1901 [Ligon, July 12 and August 2, 1917; June 16, July 28 and 29, 1919].

Algodones, Bernalillo County. On the Rio Grande, about 24 miles north and a little east of Albuquerque. [Ligon, many times from 1916-1921.]

¹ As these localities were tabulated by Professor Cooke before March 30, 1916, some of the localities are in counties which have since been subdivided, as Harding, formerly parts of Mora and Union; Catron, formerly the western part of Socorro; De Baca, formerly parts of Guadalupe and Chaves; Hidalgo, formerly the southern part of Grant; and Lea, formerly the northeastern part of Eddy. These, and the names of railroad lines, have been corrected to date.

Collectors who have visited the localities only since Professor Cooke's death are given in brackets. Aneroid altitudes are given where others were not available.

Alma, Catron County. On the San Francisco River, 10 miles from the Arizona line; 5,200 feet. Baileys, October 15, 1906; October 16, the mesa near town at 7,300 feet; Goldman, October 18-20, 1908; [Ligon, April 28, 1916, May 25, 1917; Kellogg, September 23, 1925].

Amarillo, Socorro County. On the Rio Grande about 40 miles north of San Marcial. Evermann, early July, 1887.

Ancho, Lincoln County. On the Southern Pacific Railroad about 90 miles southwest of Santa Rosa; 6,000 feet. Gaut, September 22-25, 1903.

Animas Mountains, Hidalgo County. A north and south range, the highest peak of which, Animas Peak, is 18 miles north of the Mexican boundary and 15 miles east of the Arizona line. Goldman, July 29-August 8, 1908, the main camp being on the north base at 5,800 feet, from which collecting was done to 8,000 feet; Bailey, August 6-8, 1908; [Ligon, April 1916, May 8, 1920].

Animas Valley, Hidalgo County. The southern end of the valley is in Mexico. Monument No. 67 of the Mexican Boundary Survey is in the middle of the valley at 5,200 feet. The valley varies from 5,000-5,400 feet. Mearns crossed the valley seven times in July, 1892, August and October, 1893; Goldman made his base camp at Lang Ranch, also called San Luis Springs, 5,200 feet on the International Boundary, 14 miles from the Arizona line, and was there August 10-11, 13-15, 18-19, 1908. He also spent the night of August 9 in the valley 18 miles to the northward at Gray Ranch, 5,000 feet. Bailey was at Gray Ranch and Lang Ranch, August 9-11, 1908.

Anton Chico, Guadalupe County. On the Pecos River, 33 miles northwest of Santa Rosa; 6,000 feet. Baileys, June 29, 1903; Ligon, July 8, 1913.

Apache (called also Apache Hills and Apache Mountains), Grant County. Altitude 4,400-5,400 feet. Anthony's base camp was on the east side about 5 miles southeast of Hachita on the Southern Pacific Railroad, February-October, 1886, and September to December, 1889. Mearns collected in these mountains part of April 22-May 15, 1892, from his camp 4 miles east on the International Boundary at Monument No. 40.

Apache Canyon, Union County. Near Rabbit Ear Mountain, 4 miles north of Clayton on the Colorado and Southern Railroad, 5,000 feet. Howell, August 10-12, 1903; Ligon, May, 1915.

Aragon (formerly Old Fort Tularosa), Catron County. On the Tularosa River. Baileys, October 9-10, 1906; Ligon, April 10, 1915.

Arroyo Hondo. See Hondo Canyon.

Arroyo Seco, Taos County. A Mexican hamlet in the Hondo Valley, 10 miles north of Taos. Bailey's camp was a little to the southward on the top of the mesa at 8,000 feet, August 12-14, 1904. Surber collected here January 19-February 8, 1904, from a base camp at 8,000 feet.

Artesia, Eddy County. In the Pecos Valley on the Santa Fe Railroad, north west of Carlsbad. [Ligon, June 1 and 2, 1924.]

Aztec, San Juan County. On Las Animas River, 10 miles from the Colorado line; 5,600 feet. Loring, December 3-9, 1893.

Bear Canyon, Bernalillo County. In the west foothills of the Sandia Mountains near the south end, 15 miles northeast of Albuquerque; 6,750 feet. Gaut, December 29, 1903-January 1, 1904.

Bear Canyon, Colfax County. Just at the Colorado line, 14 miles northwest of Folsom. Howell camped September 7-12, 1903, at a ranch at the mouth of the canyon; 7,000 feet. The walls of the canyon rise to about 9,000 feet.

Bear Canyon, Dona Ana County. On the west side of the San Andres Mountains, about 50 miles west of Alamogorda on the Santa Fe Railroad. Gaut collected in the foothills near there, January 17-19, 1903, and went to the top of the mountains, January 20.

Bear Ridge, Valencia County. Part of the Continental Divide in the Zuni Mountains, 20 miles south of Thoreau on the Santa Fe Railroad; 9,100 feet. Visited by Goldman June 13, 1909, from his base camp at McGaffey's.

Bear Spring Mountains (called Bear Mountains on Land Office map), Socorro County. A short range about 25 miles northwest of Socorro, rising to 8,000 feet; worked by Hollister, September 26-October 1, 1905, from a base camp on the east side.

Beaver Creek, Catron County. A main tributary of the East Gila River, from the north, about 20 miles west and a little north of Chloride. Ligon collected in the canyon and valley of this stream at approximately 6,500 feet, May 24-25 and June 5, 1913; Bailey camped here in 1908.

Beaver Lake (now known as V + T Lake), Catron County. On upper Beaver Creek, 7 miles from its mouth and about 21 miles northwest of Chloride; 7,400 feet. Bailey and Birdseye, August 26, 1908; Ligon, near here, January-May, 1913.

Beaver Pond, Taos County. On Costilla Creek, about 12 miles from the Colorado line; 9,400 feet. Bailey, August 21-24, 1904.

Belen, Valencia County. On the Rio Grande, 30 miles south of Albuquerque; 4,800 feet. Loring, January 20-21, 1894; Bailey, July 29, 1908.

Bernal (now called Chapelle), San Miguel County. On the Santa Fe Railroad, 15 miles south of Las Vegas; 6,100 feet. Bailey camped near there August 27, 1903, and collected to the top of the mesa at 7,000 feet.

Bernalillo, Bernalillo County. On the Rio Grande, 18 miles north of Albuquerque; 5,000 feet. Loring, January 18, 1894.

Bernardo, Socorro County. West side of Rio Grande. [Leopold, 1919.]

Big Hatchet Mountains (otherwise known as Hachita Grande Mountains), Hidalgo County. A north and south range, rising to 8,300 feet (aneroid) at Hatchet Peak, 10 miles west and 25 miles north of the Mexican line. Mearns collected from the base to the summit, May 18-25, 1892; Goldman collected to 7,800 feet July 18-24, 1908, from his base camp at Hatchet Ranch, 4,200 feet, 8 miles northeast of the peak and 16 miles south of Hachita on the Southern Pacific Railroad.

Big Rocky Creek. See Rocky Creek.

Bill Night Gap, Catron County. On the north rim of Spur Lake Basin, about 22 miles north of Reserve. Ligon, January, February, and March, 1915.

Black Canyon, Sierra County. In the Black Range. [Ligon, June 28, 1920.]

Black Lake, Colfax County. On Coyote Creek, 22 miles north of Mora; 8,400 feet. Baileys, September 9-10, 1903.

Black Mountain, Catron County. Near the headwaters of the Middle Gila River, 31 miles east of Mogollon and 8 miles northwest of Old Camp Vincent; summit 8,000 feet. Ligon, many times, February to April, 1913.

Black Range, Sierra County. The principal range of the county, extending north and south and rising to 9,000 feet. Climbed by Bailey at various places the summer of 1905, from his base camp at 6,500 feet near the head of the Mimbres River; north end visited by Goldman, October 11-12, 1909, from Fair View, 12 miles to the eastward; [Ligon, May 26, 1916, July 6-8, 1917, September 5, 1918, April 24 and August 23, 1919, July and August, 1920].

Blanco, San Juan County. On the San Juan River, 12 miles southeast of Aztec; about 5,500 feet. Bailey, October 20-21, 1908; Birdseye, November 14-20, 1908.

Blue Canyon, Catron County. The main canyon of the Datil Mountains. Hollister, October 6-13, 1905.

Blue Lake, Taos County. A small lake at the head of Pueblo Creek, 2 miles southeast of Wheeler Peak. Baileys, July 21, 1904.

Bluewater, Valencia County. A station on the Santa Fe Railroad, 45 miles east of Gallup; 6,600 feet. Bailey, October 25-26, 1908. A few days later, November 2, Bailey was at the headwaters of Bluewater Creek, 15 miles southwest of Bluewater in the upper part of the Zuni Mountains, which he had reached by rail from Thoreau to Kettner and the divide from Kettner to Sawyer on Bluewater Creek.

Bolles Ranch, Eddy County. Seven miles south of Carlsbad. Baileys, August 30-September 18, 1901.

Boulder Lake, Rio Arriba County. A small lake, 7 miles north of Lake Burford, 16 miles west of Tierra Amarilla and 20 miles south of the Colorado line; 7,500 feet. Bailey, September 14-16, 1904; Ligon, July 2-4, 24, 27, 30, August 3, 4, 1913.

Box Spring, Torrance County. In Manzano Mountains; 8,100 feet. Gaut, October 6-19, 1903. See Manzano Mountains.

Brazos Lakes, Rio Arriba County. In San Juan Mountains, near Good Hope, and 14 miles east of Tierra Amarilla; 9,800 feet. Bailey made this his base camp, September 7-11, 1904, and on September 7, collected to the head of one of the branches of the Brazos River at 10,100 feet, 6 miles northwest of Good Hope.

Broom Mountain, Valencia County. South of Acoma, 18 miles. Bailey's camp, September 25-27, 1906, was 4 miles northwest near Miller; 7,200 feet.

Burford Lake (formerly called Stinking Spring Lake), Rio Arriba County. The largest lake in this county and the most important breeding ground for ducks in New Mexico; about 7,000 feet. Baileys, September 26-October 3, 1904; Ligon, July 17-23, July 28-August 2, August 9-12, 1913, and [July, 1916; Wetmore, May 23-June 19, 1918].

Burgwyn (otherwise known as Camp Burgwyn and Cantonment Burgwyn), Taos County. On Rio Chiquito, 5 miles south of Taos, 7,200 feet. Anderson lived here, 1858-1860, and sent collections to the Smithsonian Institution.

Burley, Socorro County. About 50 miles northwest of Socorro and 8 miles north of the west end of the Gallina Mountains; about 7,000 feet, Hollister, September 18-20, 1905.

Burro Mountains, Grant County. A small group of low mountains, 15 miles southwest of Silver City; highest peak, 7,800 feet; Goldman, September 16-20, 1908, from a point near the northeast base, 5 miles southwest of Leopold.

Cabazon, Sandoval County. On the Rio Puerco, 45 miles northwest of Albu-

querque; 7,100 feet. Hollister, September 12-13, 1905, camped 4 miles south of the town near the base of Cabezon Peak.

Cabra Spring, San Miguel County. Stage station and post office, 25 miles directly north of Santa Rosa; 5,600 feet. Baileys camped 4 miles east June 23, 1903, and on their return from Mesa Yegua, were at a camp 3 miles west, June 26-28.

Cactus Flat, Catron County. On the divide between Dry Creek and Duck Creek, 40 miles northwest of Silver City and 13 miles from the Arizona line; 5,200 feet; Baileys, November 5-6, 1906; Goldman, October 12-14, 1908.

Cajon Bonito Creek, Chihuahua. Six miles south of Monument No. 67, Mexican Boundary Survey. Mearns explored this stream during part of July 1-24, 1892, and September 8-28, 1893, to the head of the right fork at an altitude of 4,500 feet.

Camp Burgwyn. See Burgwyn.

Canadian River, Quay County. A point on the river almost directly north of Montoya and 12 miles northeast of their Mesa Rica camp was visited by the Baileys, June 22, 1903.

Canoncita, Santa Fe County. A station on the Santa Fe Railroad, 5 miles from Lamy; Baileys, July 4, 1903.

Cantonment Burgwyn. See Burgwyn.

Canyon Blanco, San Juan County. A large dry wash tributary to the San Juan River, which it enters at Blanco, 12 miles southeast of Aztec. It was traversed by Bailey in October, 1908, and the camp of October 21 was 22 miles up the canyon from Blanco.

Canyon Largo, San Juan County. A tributary of the San Juan River from the southeast, but dry for most of the year. Its mouth is between the towns of Blanco and Largo. Bailey was at its mouth October 20, 1908, at about 5,500 feet, and ascended its valley for several miles the following day.

Capitan Mountains, Lincoln County. Their highest peak, El Capitan, rises to 11,000 feet (aneroid), 10 miles north of Lincoln. Bailey made his base camp at 6,200 feet on the east slope June 13-16, 1899, and climbed the east peak, 9,600 feet, June 14. Gaut made extensive explorations and collections in these mountains June 24-August, 27, 1903, collecting from 6,000 to 11,000 feet. He was located at a ranch in the valley on the southeast slope of the mountains, 6,000 feet, June 24-July 7; then moved to his camp No. 1 at a deserted sawmill, 9,000 feet, July 8-14; next to a camp at 7,000 feet at the southeast end of the range, collecting from here up to 8,000 feet July 14-20; then moved 5 miles east to a camp at an altitude of 8,000 feet, collecting from this camp up to 9,000 feet July 21-26; thence to a camp in the northeastern foothills at 6,000 feet, collecting from here up to 8,000 feet, July 26-28; to a camp near the summit of the range at the west end of the mountains, 9,700 feet, July 28-August 17; to a camp on the northwest slope at 7,500 feet, August 17-19; to Raspberry Patch Spring on the northwest slope at 7,000 feet, August 19-22; leaving the mountains, his last camp was at Loveless Lake about 10 miles northwest of the mountains, August 22-27.

Capitol Peak, Socorro County. At the north end of the San Andres Mountains, 10 miles northeast of Salinas Peak. Gaut, December 4-22, 1902.

Capulin Mountain, Union County. An extinct volcano, 6 miles southwest of

Folsom on the Colorado and Southern Railroad; summit 8,000 feet. This volcano was created a national monument in 1916. Howell, August 29, 1903.

Carlisle, Grant County. A mining camp about 15 miles northeast of Redrock on the Gila River; about 5,000 feet. Barrell lived here in 1890 and sent a migration report for the spring of 1890 with a list of the breeding birds.

Carlsbad, Eddy County. On the Pecos River, 30 miles north of the Texas line, 3,100 feet. Dutcher, September 12-24, 1892; Bailey, June 18-20, 1899; also in town July 19-21, 1901; at the springs 3 miles north of town, July 21-29, and at Bolles Ranch, 7 miles southwest of town, August 30-September 18; Dearborn, August 1-14, 1910; Ligon, at the reservoir a few miles north of town, June 23-24, 1913, [June 2, 1919]; Willett, at the Carlsbad Reservation, December 30, 1914, to January 20, 1915; February 21 to March 15, 1916, [December 11-23, 1917. Bailey, March 10 to May 10, 1924, on trips back and forth from the Carlsbad Cave].

Carlsbad Cave, Eddy County. Twenty-six miles southwest of Carlsbad and 13 miles north of the Texas line, at 4,500 feet; [Bailey, March 11 to May 9, 1924].

Carrizalillo Springs, Luna County. Near Monument No. 33, Mexican Boundary Survey; 85 miles west of the Rio Grande; 4,500 feet. Mearns, April 15-22, 1892.

Carriazo, Lincoln County. On the Southern Pacific Railroad, 50 miles north of Alamogordo; 5,400 feet. Gaut, October 28-November 2, 1902; [Ligon, October, 1917 and 1918].

Catskill, Colfax County. Near the head of the upper Canadian, 20 miles northwest of Raton and 3 miles from the Colorado line; 7,900 feet. Howell, September 19 and September 28-October 1, 1903.

Cebolla Springs, Valencia County. Near Miller on the Land Office map, and eighteen miles south of Acoma Pueblo; 7,200 feet. Baileys, September 26-27, 1906.

Center Fire, Catron County. About 14 miles northwest of Reserve in Spur Lake Basin. Ligon, February 8, 1915.

Cerro Verde, Valencia County. Seventeen miles west of the town of Rio Puerco. Hollister, September 16, 1905.

Chaco Canyon, San Juan County. The Chaco River is one of the main tributaries of the San Juan River, entering from the south with its mouth 25 miles from where that river leaves New Mexico. The upper part of its valley, called Chaco Canyon, was crossed by Bailey October 23, 1908, at a point near Pueblo Bonito, at an altitude of about 6,000 feet.

Chama, Rio Arriba County. A station of the Denver and Rio Grande Railroad, on the Chama River, 7 miles south of the Colorado line; 7,800 feet. Loring, December 19-29, 1893.

Chama Canyon, Rio Arriba County. A canyon on the Big Chama River about 5 miles above Abiquiu. The Baileys were there, October 12-13, 1904, and camped at 6,150 feet.

Chama River (also called Big Chama River), Rio Arriba County. On September 14, 1904, the Baileys reached this river at 7,200 feet, 3 miles from Tierra Amarilla; again September 24-26, a little east of El Vado; again October 12, on their return from the Jemez Mountains, they reached the Chama at 6,200 feet, about 12 miles above Abiquiu and thence followed down the river to its junction with the Rio Grande.

Chapelle, San Miguel County. See Bernal.

Chloride, Sierra County. On Chloride Creek in the northeastern foothills of the Black range, 30 miles north of Hillsboro, and the same distance west of the Rio Grande at the mouth of Alamosa River; 6,200 feet. Blinn lived here in 1890, and contributed a list of the breeding birds; Goldman collected here October 11-12, 1909, on his way to and from the summit of the Black range at 8,000 feet; Ligon made this place his headquarters for much of the time from March to June 8, 1913, collecting from 6,000 to 7,500 feet [May 13-17 and 28; June 2, 13, and 15, 1916; July 11, 1917; April and August, 1919].

Chuska Peak (old spelling **Choiska Peak**), McKinley County. A high peak at the south end of the Chuska Mountains, 25 miles north of Gallup and 10 miles from the Arizona line. Bailey, September 29-October 2, 1908, had his main camp northwest of the peak at 7,800 feet.

Chuska Mountains, McKinley and San Juan Counties. A double range in northwestern New Mexico near the Arizona line. The summits range from 8,600 to 9,400 feet. Gilman visited the north end of the Chuska Mountains near Shiprock five days in July, 1907; Bailey's camp, September 29-October 2, 1908, was at the south end of the mountains at 7,800 feet; then he moved 8 miles north to the Chuska Lakes at 8,800 feet, near the top of the main Chuska Mountains, and camped there October 2-6.

Cieneguilla, Taos County. A small hamlet near Rinconada; 6,000 feet. Surber, February 12-April 3, 1904.

Cimarron River, Union County. The main river of extreme northeastern New Mexico. It was visited by Howell at Folsom August 22-31 and September 5-7, 1903.

Clapham, Union County. Thirty miles southwest of Clayton, on a small tributary of the Canadian River. Seton, October 24-31, November 1, 2, 5, 11, and 27 (Brooks Ranch, 4 miles north), December 6, 7, 8, 1893.

Clayton, Union County. A station on the Colorado and Southern Railroad about 8 miles from the Texas line; 5,000 feet. Howell, August 10-13, 1903; Seton, October 22 and 23, 1893; [Bailey, April 2-5, 1918].

Clear Lake, Rio Arriba County. A small lake a short distance northwest of Lake Burford; 7,700 feet. Ligon, July 20 and August 10, 1913.

Cliff, Grant County. On the Gila River at the mouth of Duck Creek, 25 miles east of the Arizona line; 4,500 feet. Baileys, November 6-9, 1906.

Cloudcroft, Otero County. A station near the summit of the Sacramento Mountains at the upper end of the Alamogordo and Sacramento Mountain Railroad. The altitude of this station is 8,350 feet; the altitude of the town on the top of the ridge is 9,100 feet. Bailey, May 28-June 2, 1900, and September 7-8, 1902; Green, July 23-August 1, 1909; Ligon, June 17, 1913; [June 6 and September 2, 1916; June 16, 1917].

Cloverdale, Hidalgo County. At the west side of the Animas Valley, 6 miles north of the Mexican Boundary and close to the Arizona line. Mearns, July 14-18, 1892; Goldman collected near here, August 9, 1908.

Cloverdale Hills, Hidalgo County. Sometimes erroneously called Guadalupe Mountains.

Cold Springs, Valencia County. Same as Agua Fria Spring.

Cooney, Catron County. A mining town on Mineral Creek, 7 miles from its junction with the San Francisco River and 13 miles east of the Arizona line. Barrell lived here in 1889 and contributed a list of the breeding birds, and also migration reports for the spring and fall of 1889.

Copper Canyon, Socorro County. One of the principal canyons in the Magdalena Mountains. Explored by Goldman during part of August 27–September 5, 1909; collections made from 8,200 feet to the summit of the range at 10,000 feet.

Copperton, Valencia County. A lumber camp in the Zuni Mountains; most of the collections labeled Copperton were made at Agua Fria Spring, 7 miles to the south at 8,000 feet. Hollister, July 17–24, 1905.

Corona, Lincoln County. A station on the Southern Pacific Railroad, 70 miles southwest of Santa Rosa, at the foothills of the Gallinas Mountains; 6,700 feet. Gaut, October 13–15 and 23–25, 1902.

Costilla Pass, Taos County. As used by Howell, this means a pass just north of Costilla Peak and 6 miles south of the Colorado line; 10,000 feet; September 25 and 27, 1903. The Costilla Pass of Bailey's notes refers to the pass over the divide between the Red River and the Costilla River, 15 miles south of the Colorado line, and 8 miles west of the Costilla Pass marked on the land office map; summit of the Pass, 11,350 feet. Baileys, August 18, 1904.

Costilla River, Taos County. At the mouth of Comanche Creek, 8 miles from the Colorado line; 9,400 feet. Reached by the Baileys, August 18, 1904. The next day they went up stream 10 or 12 miles to 10,700 feet at a point nearly due north of Costilla Peak and east of Culebra Peak, and Bailey climbed Culebra Peak August 20, after which they retraced their course down stream August 21, and camped August 21–24 at Beaver Pond, 5 miles below the mouth of Comanche Creek, 9,400 feet; then continued on down the river, reaching the town of Costilla August 25, going thence northwest into Colorado.

Cottonwood Pass, San Juan County. Near the north end of the Chuska Mountains 8 miles northeast of Crystal. Bailey camped October 7–11, 1908, at a little lake near the Pass at about 8,800 feet.

Cottonwood Spring, Sierra County. On Cuchillo Creek, 12 miles west of Elephant Butte on the Rio Grande. Ligon, May 12 and June 10, 1913.

Cowles, San Miguel County. A post office on the Pecos, above the junction of the Mora and Pecos, about twenty miles above Pecos Town, at about 8,200 feet. [Ligon, July 10–18, 1919.]

Cow Spring, near the line of Grant and Luna Counties. About 20 miles south of Silver City. [Ligon, May 6, 1920.]

Coyote Creek, Mora County. The largest tributary of the Mora River, followed by the Baileys from a point 7 miles east of Mora up stream to Black Lake, September 7–10, 1903; they camped September 7–9 on the creek, 8 miles north of Guadalupita, 8,000 feet, and next day at the outlet of Black Lake, 8,400 feet.

Coyote Creek, Rio Arriba County. A branch of the Puerco River. The Baileys went up the canyon of this stream in climbing the Gallinas Mountains in early October, 1904, and made various camps near the town of Coyote, October 5–12, 1904, 7,000 to 8,500 feet.

Cuba, Sandoval County. On the Rio Puerco. [Ligon, many times from 1916 to 1920].

Cubero, Valencia County. A town on the road to the San Mateo Mountains, 8 miles northwest of Laguna and north of the Santa Fe Railroad. Baileys, September 20-23, 1906.

Cuchillo, Sierra County. On Cuchillo Creek, 10 miles from its junction with the Rio Grande, 25 miles northeast of Hillsboro; 4,700 feet. Goldman, October 21-23, 1909; [Ligon, July 17, 1916; 10 miles west of Cuchillo, May 15, 1916; and 15 miles west, and 2 miles east, May 25, 1917].

Cuchillo Mountains, Sierra County. A small group of hills rising to 7,000 feet, crossed by Goldman, October 21, 1909, on his trip from Fair View to Cuchillo; visited by Ligon May 4 and June 9, 1913, and [August 4, 1919].

Cuervo, Guadalupe County. A town on the Southern Pacific Railroad, 15 miles northeast of Santa Rosa; 4,800 feet. Baileys, June 9-14, 1903.

Culbertson Ranch. Diamond A (Δ A) Ranch. On the Mexican boundary, about 40 miles southwest of Hachita. [Ligon, May 9, 1920.]

Culebra Peak, Taos County. Just south of the Colorado line, the highest peak in the Culebra Mountains. It was climbed by Bailey August 20, 1904.

Currumpa, Union County. On Currumpa Creek, a tributary of the North Canadian River. Seton, January 8, 9, 13, 15, 17, 19, and 27, 1894.

Cutter, Sierra County. On the Santa Fe Railroad, southeast of Elephant Butte. [Ligon, June 28 and 30, and July 1, 1917.]

Dark Canyon, Eddy County. A canyon whose stream joins the Pecos River at Carlsbad. On their trip to the Guadalupe Mountains the Baileys followed up this canyon and camped July 30, 1901, 25 miles southwest of Carlsbad, at 3,900 feet.

Datil, Catron County. A small town, 10 miles south of the Datil Mountains and 55 miles west of Socorro; 7,700 feet. Hollister, October 15-16, 1905.

Datil Range or West Datil Mountains, Catron County. Called on the Land Office map, Datil Range; 35 miles from the Arizona line and 20 miles northeast of Joseph. Bailey's base camp, October 5-9, 1906, was at the west end near the headwaters of Largo Canyon at 8,000 feet.

Deep Lake, Chaves County. About thirty miles northeast of Roswell. [Ligon, June 6, 1924.]

Deer Creek, Hidalgo County. Goldman camped August 19-20, 1908, near the Culbertson Ranch, two miles above the mouth of the creek, close to the Mexican line and 25 miles east of the Arizona line; 4,900 feet.

Delaware Creek, Eddy County. A tributary of the Pecos rising in Texas and flowing into the Pecos from the west, 6 miles north of the Texas line. Pope, March 8-19, 1854.

Deming, Luna County. The county seat; 4,350 feet. Bailey, December 5, 1889, November 12, 1906, August 4, 1908; Goldman, August 6-September 10, 1908, during which time he explored the region around Deming and foothills of the Florida Mountains to 4,800 feet, and spent September 4-8 in a trip to the Florida and the Little Florida Mountains; [Ligon, August 26 and 27, 1917; Kellogg, March 26, 1921, and April 7, 1927].

Dexter, Chaves County. Southeast of Roswell, Pecos Valley. [Ligon, June 1, 1924.]

Diamond Creek, Catron County. A tributary of the main Gila entering it from the east about 35 miles north of Silver City. Bailey camped August 24, 1908, near the mouth of the creek at 6,800 feet. [Ligon's official duties, from 1916 to 1920, frequently took him to this stream and its tributaries.]

Dog Canyon, Eddy County. A long canyon, the head of which is in Texas and which crosses the boundary 45 miles west of the Pecos River. The lower part of the canyon at 6,100 feet was reached by the Baileys, August 9, 1901. They ascended the canyon that day to 6,700 feet, the next day to 6,800 feet, and made their base camp for the next two weeks just over the line in Texas. The trips from this camp were about evenly divided between Texas and New Mexico. The crest of the ridge above Dog Canyon rises to 8,500 feet.

Dog Spring, Hidalgo County. Near Monument 59, Mexican Boundary Survey, 42 miles east of the Arizona line; 4,800 feet. Mearns, various times, May 21-June 13, 1892, and September 15-23, 1893.

Dona Ana, Dona Ana County. A town on the Rio Grande, 5 miles north of Las Cruces and 13 miles from Fort Filmore; 3,900 feet. Henry lived here for several months; many of his specimens bear the label of this place.

Dry Creek, Catron and Grant counties. A small tributary of the San Francisco River, flowing into it 10 miles from the Arizona line. Goldman camped 6 miles above its mouth at 4,900 feet in Grant County, October 14-16, 1908; Bailey, November 5, 1906, and August 4, 1908, at mouth in Catron County.

Duck Creek, Grant County. Thirty miles northwest of Silver City. [Kellogg, November 10, 1921.]

Dulce, Rio Arriba County. A station on the Denver and Rio Grande Railroad, 5 miles from the Colorado line; 6,800 feet. Baileys, September 19-21, 1904.

Dulce Lake, Rio Arriba County. Four miles south of the town of Dulce; 6,700 feet. Ligon, August 7, 1913.

Eagle Peak, Catron County. A high peak in the Tularosa Mountains east of Reserve; summit about 9,700 feet (aneroid). Climbed by Bailey October 12-13, 1906, from Joseph on the Tularosa River.

East Datil Mountains, Catron County. A small range extending east and west and rising to 10,000 feet, 62 miles northwest of Socorro. Explored by Hollister October 6-11, 1905, from a base camp at 9,000 feet on the northwestern side, 12 miles northwest of Datil post office.

East Gila River. See Gila River.

East View, Torrance County. On the eastern side of the Manzano Mountains, just east of Manzano Peak, 25 miles east of Belen on the Rio Grande. Gaut, early October, 1903; Bailey, July 29, 1908.

Eddy, Eddy County. Same as Carlsbad.

El Capitan, Lincoln County. See Capitan Mountains.

Elephant Butte, Sierra County. A butte and station on the Santa Fe Railroad, near the Rio Grande, 35 miles north of Rincon and nearly west of Engle. The Elephant Butte Reservoir is in the vicinity. Ligon visited this place during the summer of 1913 [May 19, 24, and 25, 1916].

Elizabethtown, Taos County. On the east side of the Taos Mountains; 8,500 feet. Bailey camped September 15-20, 1903, at 8,800 feet, 4 miles southwest of Elizabethtown, and from here climbed Taos Mountain, September 17.

Elkins, Chaves County. On the Santa Fe Railroad. [Ligon, June 7, 1924.]

El Macho, San Miguel County. An abandoned Mexican village on the Pecos, about 5 miles north of the town of Pecos, 15 miles directly east of Santa Fe. Baileys, July 11 and August 21-24, 1903.

El Moro. See Inscription Rock.

El Paso Gap, Eddy County. In the Guadalupe Mountains 10 miles north of the Texas line. The Baileys camped here at 6,200 feet, August 25-27, 1901.

El Rito, Valencia County. A station on the Santa Fe Railroad, 40 miles west of Albuquerque. Hollister, September 15, 1905.

El Vado, Rio Arriba County. A town on the Big Chama River, 13 miles southwest of Tierra Amarilla; 7,200 feet. Baileys, September 24-26 and October 3, 1904.

Embudo, Rio Arriba County. On the Rio Grande. [Ligon, June 22, 1924.]

Emory Peak, Union County. A low mountain, 5 miles northeast of Folsom on the Colorado and Southern Railroad, and 7 miles from the Colorado line. Howell, August 27-28, 1903.

Enchanted Mesa, Valencia County. Near Acoma Pueblo. Baileys, September 23, 1906.

Encino, Torrance County. On the Santa Fe Railroad. Dearborn, August 19-26, 1911.

Engle, Sierra County. A station on the Santa Fe Railroad, 35 miles north of Rincon and 10 miles east of the Rio Grande. Ligon lived and collected near here for several months at different times from 1905 to 1913; Bailey, August 1 and November 6-7, 1908.

Ensenada, Rio Arriba County. A small town on the Rio Brazos, 3 miles above Tierra Amarilla; 7,700 feet. Bailey, September 11-12, 1904.

Espanola, Santa Fe County. On the Rio Grande, 23 miles north of Santa Fe; 5,900 feet. Loring, December 30, 1893-January 9, 1894; Merriam, July 15, 1896; Surber, June 11-25, 1904; Baileys, October 18-19, 1904, August 20 and 31, 1906.

Fair View, Sierra County. A town near the headwaters of Cuchillo Creek, 30 miles north of Hillsboro; 6,500 feet. Goldman, September 30-October 2, and October 7-21, 1909; Ligon, May 2, 1913, and [May 18, 1916].

Farmington, San Juan County. On the San Juan River, 15 miles southwest of Aztec; 5,700 feet. Birdseye, October 14-November 14, 1908; Bailey, October 19-20, 1908.

Faywood, Grant County. Thirty miles southeast of Silver City; 4,900 feet. Goldman, September 13, 1908.

Florida Mountains, Luna County. A small range of low mountains, 15 miles southeast of Deming; summit 7,000 feet. Goldman's base camp, September 6-8, 1908, was at 5,200 feet on the east side of Capitol Dome.

Folsom, Union County. A station on the Colorado and Southern Railroad, 10 miles south of the Colorado line; 6,400 feet. Howell, August 22-31 and September 5-7, 1903.

Fort Bayard, Grant County. A former military post, 8 miles northeast of Silver City; 6,040 feet. Stephens, spring and early summer, 1876; Wilson, summers of 1896 and 1897.

Fort Craig, Socorro County. On the Rio Grande, 5 miles below San Marcial. Henshaw, part of November, 1874.

Fort Fillmore, Dona Ana County. An abandoned Government fort near the Rio Grande, 10 miles southeast of Las Cruces. Henry, August to December, 1852; Heerman, March 21, 1854.

Fort Stanton, Lincoln County. A former army post now occupied by a marine hospital, 8 miles west of Lincoln. Henry visited the post in May, 1855.

Fort Sumner, De Baca County. A town on the Pecos River, 40 miles southeast of Santa Rosa and a few miles north of the old army post of Fort Sumner. Gaut, September 23, 1902; Ligon, June 30 to July 1, 1913.

Fort Thorn, Dona Ana County. An abandoned army post on the Rio Grande, 10 miles west of Rincon; 4,500 feet. Henry, 1854 to 1858.

Fort Tularosa, Catron County. An abandoned army post on the Tularosa River, 30 miles from its junction with the San Francisco River and 30 miles east of the Arizona line; 6,800 feet. Baileys, October 9-10, 1906.

Fort Union, Mora County. An abandoned army post 10 miles southeast of Mora. Coale, March 22, 1890.

Fort Vincent (also called Old Fort Vincent and Old Camp Vincent), Catron County. On the main Gila River, 15 miles above the main forks; 6,800 feet. The Baileys camped here the night of August 25, 1908.

Fort Webster, Grant County. An abandoned army post on the Mimbres River, a little to the north of directly east from Silver; 6,300 feet. In the older reports this is always spoken of as the Mines, or the Copper Mines. Henry, December, 1852, to early in 1854; Heerman, near here, March 8, 1854.

Fort Wingate, McKinley County. An army post 6 miles south of Wingate station, on the Santa Fe Railroad; 7,000 feet. Coues, June 28-July 8, 1864; Henshaw, July 12-17, 1873; Shufeldt, 1884-1888; Fisher, July 2-7, 1892; Hollister, June 23, 27, and 29, 1905.

Frisco, Catron County. On San Francisco River, 35 miles north of where the river flows into Arizona and 15 miles east of the Arizona line; 6,100 feet. Baileys, October 10, 11, and 13, 1906; August 31, 1908.

Fruitland, San Juan County. On San Juan River, 23 miles west of Aztec, and 17 miles south of the Colorado line; about 4,900 feet. Bailey, October 14-19, 1908.

Gallina, Rio Arriba County. A Mexican settlement on the Gallinas River, 35 miles southwest of Tierra Amarilla; at about 8,500 feet. The Baileys camped here October 4-5, 1904.

Gallina Mountains, Socorro County. A short east and west range, 40 miles northwest of Socorro. Hollister, October 19-23, 1905, explored these mountains from the middle of the south side.

Gallinas Mountains (called on Land Office map, Mesa Prieta), Rio Arriba County. North of the Jemez Mountains, and 40 miles northwest of Espanola; highest point 10,800 feet (aneroid). Explored by Bailey October 5-11, 1904, from a base camp 12 miles north of Coyote at 8,500 feet; collections made from 8,000 to 10,400 feet.

Gallinas Peak, Rio Arriba County. An isolated peak 18 miles southwest of Tierra Amarilla. Bailey's camp of October 3-4 was at the east base; 7,100 feet.

Gallinas River, Rio Arriba County. [Ligon, August 6, 1916.]

Gallo Canyon, Lincoln County. A long canyon with its head near Corona, a station on the Southern Pacific Railroad, 70 miles southwest of Santa Rosa. Traversed from a few miles northwest of Corona to 40 miles southeast by Gaut, October 15-20, 1902.

Gallup, McKinley County. A station on the Santa Fe Railroad, 15 miles east of the Arizona line; 6,500 feet. Hollister, July 3-7, 1905; Bailey, September 23-24, 1908.

Garfield, Dona Ana County. On the Rio Grande, 15 miles northwest of Rincon. Goldman, November 16-22, 1909.

Gila, Grant County. On the Gila River, 22 miles northwest of Silver City; 4,000 feet. Goldman, October 5-12, 1908.

Gila River, mainly Grant but also Catron and Hidalgo Counties. The principal river of southwestern New Mexico. The main river in the lower part near the Arizona boundary was visited by Stephens during the spring and early summer of 1876. The upper part of the main Gila, called also the East Gila, was visited by Ligon at the mouths of Diamond, Beaver, and Taylor Creeks, 6,200 to 6,400 feet, at various times January to May, 1913. The middle fork in the vicinity of Black Mountain, 7,500 to 8,000 feet, was visited at several places by Ligon, April 12 to May 1, 1913. The whole watershed of this river was extensively explored by Bailey and Goldman, and their explorations are given under the names of the various places visited; [Ligon, April 23, 1916].

Glenwood (called on some of the Land Office maps, Lone Pine), Catron County. On the San Francisco River, 10 miles from the Arizona line; 4,700 feet. Baileys, October 31 to November 5, 1906.

Globe Spring, Dona Ana County. At the north base of the Organ Mountains, 15 miles east of Las Cruces. Gaut, January 27-29, 1903.

Glorieta, Santa Fe County. A station on the Santa Fe Railroad, 10 miles northeast of Lamy and 10 miles southeast of Santa Fe; 7,400 feet. Baileys, July 4 and 7-11, 1903; Ligon, July 10-11, 1913, and [at various times from 1916 to 1918].

Glorieta, Taos County. A cottonwood grove on Pueblo Creek, 2 miles northeast of Taos and half a mile east of the Pueblo; 7,300 feet. Baileys, July 11-19, 1904.

Gold Camp, Dona Ana County. In the San Andres Mountains, 6 miles northeast of San Augustine Peak. Gaut, January 23, 1903.

Gold Hill, Taos County. Near Twining and a few miles north of Wheeler Peak. [Ligon, June 9, 1924.]

G. O. S. Ranch, Grant County. On Sapello Creek, 35 miles northeast of Silver City. Bailey, May 11-31, 1906; August 19, 1908; [Ligon, April 19, 1919.]

Gran Quivira, Torrance County. The ruins of this ancient town are on the Mesa Jumanes, 38 miles west of Corona; 6,450 feet. Gaut, September 28-29, 1903.

Grant, Valencia County. A station on the Santa Fe Railroad, 55 miles southeast of Gallup; 6,500 feet. Hollister, July 7, 11-14, and July 29-August 2, 1905; Bailey, October 26 and November 1, 1908. This is the outfitting point for excursions to the southeastern end of the Zuni Mountains.

Gray Ranch, Hidalgo County. A ranch in the Animas Valley, 13 miles north

of the Mexican Boundary and the same distance east of the Arizona line; 5,000 feet. Bailey and Goldman, August 9-10, 1908; [Ligon, May 7, 1920].

Guadalupe Mountains, Eddy County. A high range of mountains extending northwest and southeast and rising to 9,700 feet, crossing the Texas line about 40 miles west of the Pecos River. Explored by the Baileys, July 31 to August 29, 1901. Their principal camps were, July 31-August 7, 5 miles east of Queen at 6,300 feet; August 7-9 at Queen, 6,300 feet; August 9, Dog Canyon, 6,700 feet, one-half mile north of the Texas line; August 10-25, in Dog Canyon at 6,800 feet, one-half mile over the line in Texas; after which they re-entered New Mexico August 25 and crossed the mountains north and northeast, reaching Carlsbad August 29.

Guadalupe, Mora County. A town on Coyote Creek, 30 miles up stream from Watrous, a station on the Santa Fe Railroad. The Baileys camped September 6, 1903, 1 mile below the town, at 7,650 feet, just opposite the old crater of Ocate and passed the town the following day.

Hachita, Grant County. A station on the Southern Pacific Railroad, 43 miles east of the Arizona line; 4,500 feet. Goldman, July 13-18, 1908.

Hachita Grande Mountains. See Big Hatchet Mountains.

Hachita Pass, Hidalgo County. A low divide, 10 miles southwest of Hachita, near Livermore Spring; 5,100 feet. Crossed by Goldman, July 26, 1908.

Halls Peak, Mora County. A small town on Ocate Creek, 23 miles northeast of Mora; about 8,000 feet. Barber lived here in 1895 and contributed a report on the spring migration of that year and a list of the breeding birds of the vicinity.

Hatchet Peak, Hidalgo County. The highest peak near the north end of Big Hatchet Mountains, rising to 8,000 feet, 22 miles nearly due south of Hachita, and 11 miles west of the Mexican line. Explored by Goldman July 18-24, 1908, from his base camp at Hatchet Ranch.

Hatchet Ranch, Hidalgo County. A ranch at the bottom of Hachita Valley, 8 miles northeast of Hatchet Peak, and 16 miles south of Hachita; 4,200 feet. Goldman made this his base camp July 18-24, 1908.

Haut Creek, Catron County. A small stream near Black Mountain, 30 miles west of Chloride; visited several times by Ligon at 7,000-7,500 feet, January to March, 1913.

High Lonesome, Hidalgo County. Near Dry Creek at the south end of the Playas Valley about 5 miles north of the Mexican line and 25 miles east of the Arizona line; 4,700 feet. Bailey camped here the night of August 11, 1908.

Hillsboro, Sierra County. The county seat, 18 miles southwest of Las Palomas on the Rio Grande; 5,200 feet. Goldman, October 29-November 1, and November 8, 1909.

Hillsboro Peak, Sierra County. One of the highest peaks of the Mimbres range, rising to nearly 10,000 feet. Visited by Goldman the first week in November, 1909; [Ligon (8 miles west), July 4, 1917].

Hondo, Lincoln County. At the junction of Ruidoso Creek and Hondo River; 6,000 feet. Bailey camped the night of September 15, 1902, 1 mile above the town on Ruidoso Creek.

Hondo Canyon (also called Hondo Creek, and on the Land Office map, Arroyo Hondo), Taos County. A small stream, rising at over 11,000 feet on Wheeler Peaks

and flowing into the Rio Grande, 12 miles northwest of Taos. Bailey visited the mouth of the canyon at 7,800 feet, September 25, 1903. Surber collected in the lower part of the canyon at 8,000 feet, January 4-19, 1904. The Baileys camped July 19, 1904, near the mouth of the canyon at 8,200 feet and thence followed up the stream to Twining, 9,500 feet. Thence they explored the Taos Mountains in the Sangre de Cristo Range and on August 6 Bailey was at the source of Hondo Creek, a saddle between Gold Hill and Wheeler Peak, 11,200 feet. On the return trip they camped August 8-11 at about 8,200 feet in the canyon and August 12-14 at 8,000 feet nearly due north from Taos.

Hondo River, Chaves County. Formed by the junction of Ruidoso Creek and Bonita River which rise in the White Mountains. It joins the Pecos southeast of Roswell.

Hondo Valley. See Hondo Canyon.

Hope, Eddy County. On the Penasco River, 25 miles above its mouth; at about 4,000 feet. Ligon camped June 20, 1913, west of the town on the Penasco River.

Hopewell (called Good Hope on Land Office map), Rio Arriba County. Fifteen miles east of Tierra Amarilla; 9,700 feet. Baileys, September 7, 1904.

Horse Lake, Rio Arriba County. A small lake, 15 miles northwest of Tierra Amarilla; 7,800 feet. Baileys, September 22-24, 1904; Ligon, July 26-28, 1913.

Indian Canyon, Hidalgo County. Also called Animas Canyon, 3 miles south of Adobe Ranch. This was Goldman's base camp for the Animas Mountains, July 28-August 9, 1908. Specimens taken here were labeled Adobe Ranch.

Indian Creek (also called Gold Creek), Taos County. A few miles northeast of Costilla Peak and about 5 miles from the Colorado line. Howell reached its mouth at 8,000 feet, September 22, 1903; camped that night and to September 25, 5 miles above the mouth, at 9,000 feet; then went up to the head of the canyon to the place he calls Costilla Pass.

Indian Spring Canyon, northeast of Cloudercroft; [Ligon, June 16, 1917.]

Inscription Rock (also called El Moro), Valencia County. A high rock now a National Monument west of the south end of the Zuni Mountains, 25 miles directly east of Zuni; about 7,100 feet. Woodhouse, August, 1851; Kennerly, November 18, 1853; Coues, 1864; Henshaw, 1873.

Isleta, Bernalillo County. On the Rio Grande, 12 miles south of Albuquerque; 4,900 feet. Hollister, August 24-30, 1905.

Jack Creek, Santa Fe County. One of the ultimate sources of the Pecos River. The Baileys camped July 21-August 7, 1903, on this stream, 2 miles from its source on the east side of Pecos Baldy Mountain, and 11 miles from Willis at 11,000 feet.

Jal, Lea County. Near the Texas line, in the southeastern corner of the State, [Ligon, January, 1919.]

Jara Peak, Socorro County. At the north end of the Bear Spring Mountains, 35 miles northwest of Socorro. Hollister, September 22-24, 1905; collections made here were labeled Riley, which was the base camp 5 miles east.

Jarilla, Otero County. A station on the Southern Pacific Railroad, 35 miles from the Texas line. Gaut used this as his base camp January 1-5, 1903, in exploring the Jarilla Hills, a few miles to the west.

Jemez, Sandoval County. A Mexican town on the Jemez River, 45 miles west of Santa Fe. The Baileys camped September 9-10, 3 miles north of the town at 5,200 feet, and visited the Pueblo September 10, 1906.

Jemez Mountains, Sandoval County. A high range, the highest point of which, Santa Clara Peak, is 20 miles west and a little north of Espanola on the Rio Grande. These mountains were explored by the Baileys August 20 to September 10, 1906. Collecting was done from 7,000 feet in Santa Clara Canyon to 11,200 on Pelado Peak, after which they crossed the divide to the upper waters of San Antonio Creek, following down this stream and the Jemez River to Jemez. See Santa Clara Canyon for their various camps during this trip.

Jemez River, Sandoval County. A large tributary of the Rio Grande from the west with its mouth 5 miles above Bernalillo. The Baileys camped on the river about 25 miles above its mouth near the town of Jemez, the night of September 9, 1906, at 5,200 feet.

Jicarilla Mountains, Lincoln County. A small group of mountains, the highest point of which, Jack's Peak, is 10 miles east of Ancho, a station on the Southern Pacific Railroad, 25 miles southwest of Corona. Collections were made by Gaut, in the foothills on the east side, August 28, 1903, and from this time till September 8 high up on the north and south slopes, and September 9-21 in the foothills on the northwest side at 6,100 feet.

Johnson Mesa, Colfax County, east of Raton. [Ligon, November 23 and 24, 1926.]

Jornado del Muerto, Sierra, Socorro, and Dona Ana Counties. A great valley lying between the San Andres Range and the Sierra de los Caballos, east of the Rio Grande. Ligon, at different times from 1905 to 1913.

Joseph, Catron County. On the Tularosa River, 10 miles from its junction with the San Francisco River and 30 miles east of the Arizona line; 6,500 feet. Baileys, October 11-13, 1906. This was the base camp for the exploration of the Tularosa Mountains to the southeast, rising to 9,600 feet.

Kenna, Roosevelt County. On the Santa Fe Railroad. [Ligon, June 7, 1924.]

Kettner, Valencia County. A station on the Zuni Mountain Railroad, 16 miles southwest of Thoreau, a station on the Santa Fe Railroad. Bailey, November 2-3, 1908; Goldman, June 12-13, 1909.

Kimbetch Wash, Rio Arriba County. A dry valley tributary to Canyon Largo. Bailey camped here at a rain pool the night of October 22, 1908, about 45 miles southeast of Aztec and about 20 miles northeast of Chaco Canyon; about 7,000 feet.

Kingston, Sierra County. Ten miles west of Hillsboro, at the eastern base of the Mimbres range; 6,200 feet. Goldman made this his base camp November 2-7, 1909, for collecting nearly to 10,000 feet in the Mimbres range.

Koehler Junction, Colfax County. Twenty miles southwest of Raton, on the Raton and Ute Park Railroad. Kalmbach worked here from July 28 to October 24, 1913.

La Cuesta, San Miguel County. A town on the Pecos River, below San Miguel. The Baileys camped between Anton Chico and La Cuesta the night of June 29, 1903, and passed through the town the following day.

La Cueva, Mora County. A small town on the Mora River, 5 miles down stream from Mora; at 7,000 feet. The Baileys passed here September 5, 1903, and camped that night 2 miles north of the town.

Laguna, Valencia County. A station on the Santa Fe Railroad, 40 miles west of Albuquerque; 5,800 feet. Kennerly, November 13, 1853; Hollister, August 7-11, 1905; Baileys, September 15-20, 1906.

La Jara Creek, Sandoval County. A small creek in the higher Jemez Mountains. The Baileys reached this creek near its head on September 5, 1906, by crossing the divide from the headwaters of Santa Clara Creek, and followed La Jara Creek to its mouth where it joins San Antonio Creek at 8,500 feet.

La Jara Lake, Rio Arriba County. A small artificial lake, 7 miles west of Boulder Lake; 7,500 feet. Baileys, September 16-17, 1904.

La Joya, Socorro County. On the Rio Grande north of Socorro. [Ligon, January 16, 1920.]

Lake Burford (formerly Stinking Spring Lake), Rio Arriba County. See Burford Lake.

Lake Fork (also called South Fork), Taos County. A small stream rising high up on the west side of the Taos Mountains and flowing into Hondo Canyon near Twining. Bailey went up this stream July 20, 1904, to the lake at about 11,200 feet at its head.

Lake Peak, Santa Fe County. Twelve miles northeast of Santa Fe. [Ligon, July 4, 1927.]

Lake Valley, Sierra County. An old silver mining camp, 15 miles south of Hillsboro; 5,400 feet. Goldman, November 8-15, 1909; collections were made from 5,000 to 5,005 feet.

Lamy, Santa Fe County. About 15 miles southeast of Santa Fe, on the Santa Fe Railroad. [Ligon, February, 1917.]

Lang Ranch, Hidalgo County. Also called San Luis Springs; on the International boundary, 15 miles east of the Arizona line; 5,200 feet. Mearns used this as his base camp for his explorations of the western slope of the San Luis Mountains during parts of June and July, 1892, and August 21-October 2, 1893; Goldman used this ranch August 10-19, 1908, as his base camp for his explorations of the San Luis Mountains, and was at Lang Ranch August 10-11, 13-15, and 18-19. Bailey and Birdseye were also here, August 10-11.

La Plata, San Juan County. A small town on the La Plata River, 5 miles from the Colorado line and 15 miles northwest of Aztec. Loring, December 9-12, 1893.

Largo, San Juan County. A town on the San Juan River, 2 miles from Blanco and 14 miles southeast of Aztec. Bailey, October 20, 1908.

Largo Canyon, Catron County. A short canyon, rising in the Datil range about 30 miles northeast of Joseph and 30 miles east of the Arizona line. The Baileys, October 2-5, 1906, camped a short distance up the canyon and later, October 5-9, explored the Datil range from their base camp near the headwaters of Largo Canyon at 8,000 feet.

Las Cruces, Dona Ana County. On the Rio Grande, 40 miles north of the Mexican boundary; the railroad station of the New Mexico Agricultural College, which is a short distance east of town. The part of the town occupied by the Agricultural College was formerly called Mesilla Park, and the many notes recorded from the vicinity of Las Cruces have been given under the name, Mesilla, which see.

Las Palomas, Sierra County. On the Rio Grande, 30 miles north of Rincon; 4,200 feet. Goldman, October 23-29, 1909.

Las Vegas, San Miguel County. A station on the Santa Fe Railroad; 6,700 feet. Emery, August 14, 1846; McCall, September, 1850; Mitchell, January-June, 1898; Atkins, during the spring migration of 1902; Baileys, August 28-September 1, 1903.

Las Vegas Hot Springs, San Miguel County. Seven miles northwest of Las Vegas. Batchelder, December 4-24, 1882; Merriam, July 25, 1889.

Little Florida Mountains, Luna County. A north spur of the Florida Mountains. Goldman, September 4-5, 1908.

Logan, Quay County. A station on the Chicago, Rock Island, and Pacific Railroad, where this line crosses the Canadian River, 20 miles west of the Texas line. Bailey, September 22, 1902.

Long Canyon, Taos County. On the Colorado line, 15 miles northwest of Raton. Howell, September 17-19, 1903.

Lordsburg, Hidalgo County. A station on the Southern Pacific Railroad, 20 miles from the Arizona line; 4,237 feet. Baileys, June 1-3, 1907, and Bailey, August 13, 1908.

Los Palos, Lincoln County. A Mexican ranch at the east foot of the Capitan Mountains; 6,200 feet. Bailey and Higginson, June 13-16, 1899.

Los Pinos, Bernalillo County. On the Rio Grande, 20 miles south of Albuquerque. Coues, June, 1864.

Lost Trail Creek, Taos County. The Baileys camped on this creek at 10,700 feet, August 16-18, 1904, near Costilla Pass and 7 miles northeast of the town of Red River.

Loveless Lake, Lincoln County. About 10 miles northwest of the base of the Capitan Mountains. Gaut, August 22-27, 1903.

Lower Penasco, Otero County. A town on the Penasco River, 55 miles from its mouth, and 30 miles east of Clouderoft. Ligon, June 20, 1913.

Lucero Creek, Taos County. A small stream rising in the Taos Mountains and joining Pueblo Creek a few miles from Taos. The Baileys camped September 21-October 1, 1903, in the valley of this creek, 6 miles north of Taos, at 7,700 feet, and Bailey visited the source of the creek as it comes out of Bear Lake at 12,000 feet, July 17, 1904.

Luna, Catron County. On the northeast side of the San Francisco range, 5 miles from the Arizona line. Bailey camped the night of September 4, 1908, a mile west of Luna, at 7,600 feet.

Magdalena, Socorro County. At the northwest base of the Magdalena Mountains, 20 miles west and a little north of Socorro; 6,400 feet. Hollister, October 25, 1905; Goldman, August 26-27 and September 5-9, 1909.

Magdalena Mountains, Socorro County. A short range extending north and south and rising to 11,000 feet on Old Baldy. Goldman, August 27-September 5, 1909, made his base camp in Water Canyon at the northeast base, 6,500 feet, and his explorations were carried up to the crest of the main range on the eastern side at 10,000 feet.

Mal Pais (also called Ancient Lava Beds), Otero County. Gaut, on December 4, 1902, visited them at a point about 10 miles west of Salinas, a station on the Southern Pacific Railroad.

Mangas Springs, Grant County. In Mangas Valley, northwest of Silver City. Bailey, November 9, 1906.

Mangas Valley, Grant County. A short valley, about 15 miles northwest of Silver City; lowest part, 4,800 feet. Baileys, November 9-10, 1906; Goldman, October 4-5, 1908.

Manzano Mountains, Torrance County. A high range extending north and south, the highest point, Manzano Peak, 11,000 feet, 20 miles east of Belen on the Rio Grande. This range was explored very thoroughly by Gaut, October 3 to December 22, 1903. He camped October 3-5, at Box Spring in the southeastern foothills, 7,600 feet; October 6-19, at the east slope near the southern end, 7,500 to 8,100 feet; October 20, the summit near the south end at 10,200 feet; October 23-25, on the east slope near the middle of the range, 8,000 to 9,500 feet; October 26-29, at the south end near Priest Canyon, 7,200 to 8,000 feet; November 1-4, the east slope and foothills, 6,500 to 7,400 feet; November 5-10, the foothill on the east slope at the south end, 5,600 feet; November 11-26, at the north end, 7,800 to 8,400 feet; November 27-December 1, the north end at 8,900 feet; December 2-13, east slope near Manzano village at 8,000 to 8,200 feet; December 13-14, the summit at 10,200 feet; December 15-22, the eastern slope in the middle near Tajique, 8,400 to 9,700 feet, and on December 20 he climbed to the summit at 10,000 feet. Bailey climbed Manzano Peak July 30, 1908, coming from the east by way of Mountainair and Eastview.

Mayberry Lake (also known as Patterson Lake), Catron County. About 75 miles west of Magdalena, at the west end of the San Augustine Plains. Ligon, April and May, 1915.

Mayhill, Otero County. A town on the Penasco River, 15 miles east of Cloudcroft. Ligon, June 19, 1913.

McGaffey Camp, Valencia County. In the Zuni Mountains near the head of Bluewater Creek, 6 miles southwest of Mount Sedgwick; 8,500 feet. Goldman, June 13-19, and 25-26, 1909.

McKenzie Ranch, De Baca County. In the Pecos Valley, about 20 miles south of Fort Sumner. [Ligon, June 17, 1918.]

Mesa Jumanes, Torrance County. An extensive mesa, 15 to 20 miles northeast of Socorro; the southern part visited by Gaut September 27, 6,200 feet; Gran Quivira September 28-29 and the northern part, 6,500 feet, September 20-October 2.

Mesa Prieta. See Gallinas Mountains.

Mesa Rica, San Miguel County. A low mesa about 10 miles northwest of Montoya and 30 miles northeast of Santa Rosa; 4,800 feet. Baileys, June 20-23, 1903.

Mesa Yegua (sometimes mapped as Mesa del Agua de las Yegua), San Miguel County. Near the Conchas River, 30 miles north of Santa Rosa; top of the mesa, 7,400 feet. The Baileys climbed this mesa June 25, 1903, from a camp 3 miles to the southwest at 6,000 feet.

Mescalero, Otero County. Indian Agency, 20 miles northeast of Alamogordo; 7,000 feet. Bailey, September 10, 1902.

Mesilla (also called Mesilla Park), Dona Ana County. On the Rio Grande, 40 miles from the Mexican line. This is a name given to the southern part of the town of Las Cruces, and all collections at the latter place have been listed under the

name of Mesilla. The New Mexico Agricultural College is located here. Loring, January 25-26, 1894; Barber, a student at the college about 1897, collected in the vicinity of the town; Metcalf, also a student at the college, collected here for several years subsequent to 1903; Bailey August 1-2 and November 7-9, 1908; Goldman, November 23-28, 1909. Miss Ford lived here for several years and published her observations in 1911; Merrill also lived here for several years, and in 1913 sent to the Biological Survey a synopsis of his observations up to that date.

Middle Gila River. See Gila River.

Miller, Valencia County. On Bluewater Creek, 30 miles southwest of Laguna on the Santa Fe Railroad. Baileys, September 26-27, 1906; using the nearest 1898 Land Office map name, Cebolla Springs.

Mimbres Range, Sierra County. A high range about 15 miles southwest of Hillsboro. The highest peaks, about 10,000 feet, are some 4-5 miles west of Kingston. Goldman made collections here, November 2-7, 1909, from 6,200 to 9,500 feet, using Kingston as his base camp.

Mineral Creek, Sierra County. Northwest of Chloride. [Ligon, May 21 and June 30, 1920.]

Mogollon, Catron County. A mining camp on Silver Creek, 8 miles east of Alma on San Francisco River; 6,900 feet (aneroid). The Baileys passed here October 16, 1906, on their way to the Mogollon Mountains, and returned October 31; Goldman was here October 20 and 31, 1908, during his trip to the Mogollon Mountains.

Mogollon Mountains, Catron County. An extensive range culminating at 11,000 feet in Mogollon Mountain. The Baileys explored these mountains in 1906, October 17-29; going east from Mogollon up the graded road to the top of the ridge at 9,300 feet, then along the ridge above Willow Creek, to 9,000 feet, making their base camp at 8,500 feet on Willow Creek, about 12 miles east of Mogollon; from which collecting was done to the top of Willow Mountain at 10,800 feet. Goldman explored this range October 21-31, 1908, coming up on the west side from the town of Mogollon and collecting from 7,000 feet to the top of the range at 10,700 feet, a few miles north of Mogollon Mountain.

Monica Canyon, Socorro County. Near the middle of the north side of the northern part of the San Mateo Mountains. Explored by Goldman, September 10-11, 1909, from 8,000 feet at its base to 9,800 feet at its head.

Monica Spring, Socorro County. On the east side of the Plains of San Augustine, 23 miles southwest of Magdalena; 7,000 feet. Goldman's base camp September 9-26, 1909, from which he made several trips to various parts of the San Mateo Mountains and to the bottom of the San Augustine plain.

Monticello, Sierra County. [Ligon, October 7, 1918.] See Alamosa River.

Montoya, Quay County. A station on the Southern Pacific Railroad, 35 miles northeast of Santa Rosa. The Baileys camped June 14-20, 1903, 6 miles southwest of here at 4,700 feet.

Monument, No. 1, Mexican Boundary Survey, Dona Ana County. On the west side of the Rio Grande; 3,700 feet. Mearns, February 1-March 14, 1892.

Monument No. 15, Luna County. Fifty-eight miles west of the Rio Grande; 4,200 feet. Mearns, March 20-April 7, 1892.

Monument No. 40, Luna County. At the corner where the boundary line

turns south near longitude 108 degrees; 99 miles west of the Rio Grande; 4,400 feet. Mearns, April 22-May 15, 1892.

Monument Park, Sierra County. Twelve miles west of Chloride. [Ligon, April 25, 1919.]

Mora, the county seat of Mora County. Thirty miles north of Las Vegas. The Baileys camp of September 4, 1903, was 10 miles south of Mora at 7,300 feet, and they passed through the town the following day.

Mora Creek, San Miguel County. A small tributary of the Pecos River, joining that stream 16 miles above Pecos City. The Baileys camped on the Pecos at the mouth of the Mora, July 12-18 and August 17-19, 1903.

Moreno Valley, Colfax County. An extensive valley between Taos Pass and Agua Fria Peak, 25 miles north of Mora. The Baileys camped here near the head of Coyote Creek, September 10-12, 1903, at 8,700 feet.

Mosquito Springs, Chihuahua. Near Monument 46, Mexican Boundary Survey, 130 miles west of the Rio Grande; 4,200 feet. Mearns, part of May 10-21, 1892.

Mott Ranch, Guadalupe County. On the west side of the Pecos River, 8 miles north of Santa Rosa; 6,400 feet. Baileys, May 23-30, 1903.

Mountainair, Torrance County. A station on the Santa Fe Railroad, 30 miles east of Belen; on the height of the divide between the Rio Grande and the valley east of the Manzano Mountains; 6,600 feet. Bailey, July 29-31, 1908.

Mount Sedgwick, Valencia County. Fifteen miles directly west of Grant on the Santa Fe Railroad, the highest point of the Zuni Mountains; 9,300 feet. Goldman, June 22-25, 1909.

Mount Taylor, Valencia County. Ten miles northeast of Grant, the highest point of the San Mateo Mountains; about 11,000 feet. Hollister, August 13, 1905; Baileys, September 21, 1906 [Ligon, June 22 and 24, and July 25, 1916; July 23 and 25, 1917].

Nara Visa, Quay County. On the Chicago, Rock Island, and Pacific Railroad. [Ligon, June, 1924.]

Negrito Creek, Catron County. A tributary of the San Francisco River, which it joins 20 miles above Alma at 6,300 feet. Bailey camped in the canyon of this creek August 31, 1908, at 7,200 feet, and explored it up to the mouth of Beaver Dam Creek at 8,000 feet.

Nutrias (also called Nutria Springs), McKinley County. On the road from Fort Wingate to Zuni, 20 miles south of Fort Wingate; 6,900 feet. Henshaw, July 19, 1873.

Oak Canyon, Union County. A short canyon, 15 miles long, opening into Cimarron Canyon, 5 miles north of Folsom on the Colorado and Southern Railroad, and about 7 miles south of the Colorado line; 6,400 feet. Howell, August 31-September 5, 1903.

Ocate Crater, Mora County. A volcanic cone southeast of Guadalupita and about 15 miles northeast of Mora. Baileys, September 6, 1903.

Ojo Caliente, McKinley County. A small village, 13 miles southwest of Zuni and 5 miles from where the Zuni River enters Arizona. Bailey, September 21, 1908.

Ojo Caliente (called on the Land Office map, Cherryville), Socorro County. On the Alamosa River, 45 miles north of Hillsboro; 6,000 feet. This was Goldman's starting point for the San Mateo Mountains, September 30 and October 2-3, 1909.

Ojo de la Parida, Socorro County. A small stream entering the Rio Grande from the east, 5 miles north of Socorro. Goldman, August 18-19, 1909.

Old Fort Tularosa, Catron County. See Fort Tularosa and Aragon.

Old Fort Union. See Fort Union.

Old Fort Vincent. See Fort Vincent.

Old Fort West, Grant County. On the Gila River, just below the town of Cliff and 25 miles from the Arizona line. Stephens, May, 1876.

Old Fort Wingate, Valencia County. Near San Rafael and five miles south of Grant, on the Santa Fe Railroad. Bailey, October 27, 1908.

Organ City, Dona Ana County. A small town at the north end of the Organ Mountains, 15 miles northeast of Las Cruces. Gaut, January 24, 1903.

Organ Mountains, Dona Ana County. A small range, 15 miles east of Las Cruces, of which Organ Peak, 8,900 feet, is the highest point. Gaut explored the northern part of these mountains January 25-29, 1903; Bailey, the southern part up to 7,000 feet, November 9, 1908.

Pajarito Creek, Guadalupe and Quay Counties. A large tributary of the Canadian River, which it joins 10 miles north of Tucumcari. The Baileys crossed this creek June 20, 1903, at 4,700 feet, about 8 miles west of Montoya.

Palomas Lakes, Chihuahua. One mile south of Monument 21, Mexican Boundary Survey; about 65 miles west of the Rio Grande; 4,000 feet. Mearns, April 7-15, 1892.

Palomas Springs, Sierra County. On the Rio Grande, 5 miles above Las Palomas. Ligon, May 6-9 and June 11-12, 1913, and [May 24 and 25, 1916].

Parker Lake, Dona Ana County. A small alkali lake, 8 miles east of the Organ Mountains, and 22 miles east of Las Cruces. Gaut, January 26, 30, 31, and February 1, 1903.

Patterson, Catron County. On the western side of San Augustine Plain, 15 miles east of Old Fort Tularosa.

Pecos, San Miguel County. A small town on the Pecos River, 37 miles directly west of Las Vegas; 7,000 feet. Baileys, July 3-4, and August 24-26, 1903; [Ligon, July 8, 1919].

Pecos Baldy Peak, Santa Fe County. One of the high peaks of the Sangre de Cristo Range 12,623 feet, 20 miles northeast of Santa Fe. The Baileys' base camp, July 21-August 7, 1903, was on Jack Creek, at 11,000 feet, and from August 7-17, three miles higher up at 11,600 feet at the east base of Pecos Baldy; during this time collecting was done from 10,500 to 12,600 feet [Ligon, July 18, 1919.]

Pecos River, San Miguel County. The principal river of southeastern New Mexico. In 1903 the river was reached by the Baileys a few miles above Santa Rosa and followed up to its source. Their camp of July 11 was at the mouth of Indian Creek, 12 miles above Pecos; July 12-18, 4 miles higher up at the mouth of Mora Creek; July 18-21, 1 mile above Willis (now Cowles) at 8,100 feet, 23 miles above Pecos, and July 21-August 7, 10 miles higher up on Jack Creek at 11,000 feet.

Pelado Peak, Sandoval County. Twenty-five miles west and a little south of Espanola on the Rio Grande, one of the highest points in the Jemez Mountains; 11,200 feet. Explored by the Baileys, September 6, 1906, from their camp at 8,500 feet in Valle Santa Rosa.

Penasco River, Otero and Eddy Counties. A large stream rising in the Sacramento Mountains and flowing into the Pecos River, 25 miles up stream from Carlsbad. Bailey and Hollister crossed this stream near its head, September 6, 1902, and came down its valley near Mayhill, 20 miles east of Cloudcroft, at 6,100 feet. Ligon traversed the whole length of this river in 1913, leaving Cloudcroft June 17, being at the James Canyon June 18, Mayhill June 19, Lower Penasco June 20, and Hope June 21; [near Mayhill, October, 1917].

Perico, Union County. Ranch and river 20 miles northwest of Clayton. Seton, November 14-20, December 11, 18, 19, 20, 26, 28, 30, 1893, and January 3, 1894.

Pinabettitos River, Union County. Seven miles west of Clapham. Seton, November 25 and December 25, 1893.

Pinos Altos, Grant County. In the edge of the Pinos Altos Range. [Ligon, at various times from 1918-1920.]

Pinos Altos Mountains, Grant County. A low range 8-10 miles north of Silver City; explored by Fisher during part of June 27-July 12, 1894, when he collected from 7,000 to 8,000 feet.

Pinyon Mountain, Catron County. An isolated peak rising to 10,000 feet, 8 miles north of the Datil Range and 35 miles east of the Arizona line. Explored by the Baileys, October 3, 1906.

Playas Lake, Hidalgo County. A long alkali flat, covered with a few inches of water after heavy rains. It is in the north end of the Playas Valley, about 15 miles west of Hachita. Goldman, July 26-27, 1908; Bailey, August 5, 1908.

Playas Valley, Hidalgo County. A wide valley, between the Big Hatchet Mountains on the east and the Animas Mountains on the west, about 4,500 feet at its lowest part. The water from the Playas Valley flows into Hatchet Valley through a gap at the north end of the Big Hatchet Mountains. Goldman crossed this valley July 26-27, 1908 on his way from Hachita to the Animas Mountains, and recrossed it August 20-21, some 15 miles farther south on his return trip to Hachita. Bailey crossed it in the same places on August 5 and 13.

Pleasanton, Catron County. A small town on the San Francisco River, 10 miles from the Arizona line; 4,700 feet. Bailey, November 5, 1906; Goldman, October 16-18, 1908.

Point of Rocks, Socorro County. On the San Augustine Plain, 15 miles southwest of Monica Spring, at the western end of the northern part of the San Mateo Mountains; 7,500 feet. Goldman, September 26-27, 1909.

Pope Well, Eddy County. A camping spot 7 miles east of the Pecos River and 1 mile from the Texas line. One of Pope's parties camped here in March, 1854.

Portales, Roosevelt County. A station on the Santa Fe Railroad, 15 miles west of the Texas line. Bailey and Higginson, June 7-8, 1899, and September 21, 1902.

Pot Creek, Taos County. About 15 miles southeast of Taos. [Ligon, June 22, 1919.]

Powderhorn Canyon, Grant County. A tributary of the Mimbres from the east, about 25 miles northeast of Silver City. Bailey was collecting near its mouth, May 24-25, 1906.

Priest Canyon, Torrance County. At the south end of the Manzano Mountains; 7,200 feet. Gaut, October 26-27, 1903.

Pueblo Bonito, San Juan County. In the Chaco Canyon a few miles southeast of Putnam. Bailey, October 23-24, 1908.

Pueblo Creek, Taos County. A small stream rising in the Taos Mountains and flowing into the Rio Grande, 10 miles above Rinconada. The Pueblo of Taos is situated on the banks of this stream, 8 miles above its mouth and for this reason the stream is often called Taos Creek. Bailey, on July 17, 1904, followed it from its source at 12,700 feet down to the Pueblo.

Punta Malpais, Valencia County. Point of lava bed and a Mexican ranch, about 10 miles southwest from the post office of Miller; 6,900 feet. Bailey, September 28-29, 1906.

Queen Ranch (called on the Land Office map, Queen), Eddy County. Near the upper end of Dark Canyon, 35 miles southwest of Carlsbad and 12 miles from the Texas line; 6,300 feet. Baileys, August 7-9, 1901.

Quemado, Catron County. On Rito Creek, 35 miles east of the Arizona line and 30 miles north of Old Fort Tularosa; 7,000 feet. The Baileys were here, October 1, 1906.

Questa, Taos County. On the Rio Colorado, 7 miles from its junction with the Rio Grande and 20 miles from the Colorado line; 8,100 feet. Baileys, August 15, 1904.

Rabbit Ear Mountain, Union County. An isolated peak, rising to 5,800 feet, 7 miles north of Clayton and 13 miles west of the Oklahoma line. Howell, August 10, 1903.

Raspberry Patch Springs, Lincoln County. On the north side of the Capitan Mountains near the west end. Gaut, August 19-22, 1903.

Raton, Colfax County. At 6,635 feet altitude, on the Santa Fe Railroad.

Rea Ranch, Torrance County. In the Manzano Mountains, west of Tajique, near Bosque Peak; 10,500 feet. Gaut, December 20, 1903.

Red River. For the Red River, which is tributary to the Rio Grande, see Rio Colorado; for the Red River east of the Sangre de Cristo Range, see Canadian River.

Red River (town), Taos County. A mining town on the Rio Colorado, 10 miles east of Questa and 20 miles from the Colorado line; 9,200 feet. Baileys, August 16, 1904.

Redrock, Grant County. On the Gila River, 20 miles from the Arizona line; 3,800 feet. Goldman, September 24-October 3, 1908; [Kellogg, May 8, 1922, May 13 and 14, 1924].

Reserve, Catron County. On the San Francisco River, 25 miles above Alma and 15 miles from the Arizona line; 6,200 feet. Bailey, August 31, 1908.

Ribera, San Miguel County. On the Pecos River, 50 miles above Santa Rosa; a station on the Santa Fe Railroad, 20 miles southwest of Las Vegas. Baileys, June 20-July 3, and August 26-27, 1903.

Riley, Socorro County. A town on the Salado River, 20 miles north of Magdalena. Hollister, September 22-25, 1905. Collections marked Riley were really made 3 miles west at the foot of Jara Peak.

Rincon, Dona Ana County. A station on the Santa Fe Railroad situated on

the Rio Grande, 35 miles north of Las Cruces. Goldman, November 15-16 and 22, 1909.

Rinconada, Taos County. On the Rio Grande, 20 miles north of Espanola; 5,800 feet. Surber, April 14-June 5, 1904.

Rio Alamosa, Sierra County. Goldman camped on this river September 27-30, 1909, at the mouth of Limestone Canyon, 30 miles north of Chloride and 38 miles west of San Marcial; 6,900 feet.

Rio Colorado, Taos County. This is also called Red River. A tributary of the Rio Grande, which it enters 25 miles south of the Colorado line. The Baileys camped near its mouth 2 miles below Questa, August 14; 3 miles above Questa, August 15; followed up the stream August 16 to the town of Red River and then turned away from the main stream and followed up Bitter Creek and Lost Trail Creek.

Rio Grande Bird Reserve (including the Elephant Butte Reservoir), Sierra County. [Willet, November 23-December 9, 1916.]

Rio Grande Valley, Santa Fe, Sandoval, Bernalillo, Valencia, and Socorro Counties. Leopold constantly traversed this section, in his Forest Service work, from 1911 to 1924. Ligon also continuously traversed the middle Rio Grande Valley, in his Biological Survey work, from 1915 to 1920.

Rio Mimbres; Heads in the Black Range and flows southward, east of Silver City. Bailey, May 13-29, 1906; [Kellogg, 1919, 1920, 1921, 1922.]

Rio Puerco, Valencia County. A town on the Puerco River, where this river is crossed by the Santa Fe Railroad, 50 miles north of Socorro; 5,000 feet. Hollister, September 3-7, 1905, during which time he collected along the river from a few miles below the town up stream to the mouth of the San Jose River.

Road Canyon, Taos County. On the divide between the upper Canadian and the Vermejo rivers, about 25 miles west of Raton. Howell camped September 19-21, 1903, at a spring near here, 6 miles southwest of Catskill.

Rocky Creek, Grant County. Also called Big Rocky Creek. A tributary of the Gila, entering it from the east; about 25 miles north and a little east of Silver City. Bailey camped here at 8,100 feet, August 21-24, 1908.

Rodeo, Hidalgo County. A station on the Southern Pacific Railroad, just at the Arizona line, and 35 miles north of the Mexican line. Allan Brooks and J. E. Law collected here April 9, 28, and 29, 1913.

Roswell, Chaves County. On the Hondo River, 8 miles from its junctions with the Pecos; 3,500 feet. Bailey and Higginson, June 8-12 and 17-18, 1899; Bailey and Hollister, September 17-18, 1902, remaining 3 miles north of Roswell until September 21; Gaut, September 10-18, 1902; Ligon, June 27, 1913, and [May 29 and 30, 1919].

Ruidoso, Lincoln County. A small town on the road from Lincoln to the Mescalero Agency, about half way between the two places. Bailey camped September 12-15, 1902, on Ruidoso Creek, 6 miles above the town at 7,200 feet and climbed to the top of Sierra Blanca at 11,880 feet.

Ruins of Gran Quivira. See Gran Quivira.

Sacramento Mountains, Otero County. The largest mountain range in southeastern New Mexico. The foothills on the west side were explored by Gaut, November 13-15 and November 26-29, from Tularosa. The lowest gap between these mountains and the Guadalupe Mountains, 6,600 feet, was crossed by Bailey,

September 5, 1902; [Ligon, September 1-6, 1916; October 16, 1917]. For other notes on these mountains, see Clouderoft and Weed.

Salada Hills, Sierra County. Fifteen miles west of Las Palomas on the Rio Grande. Goldman, October 24-28, 1909.

Salinas Peak, Socorro County. Near the north end of the San Andres Mountains, rising to 8,500 feet, 25 miles directly west of Salinas, a station on the Southern Pacific Railroad. Gaut collected on the west slope, December 6-10, 1902, at 5,600 to 6,000 feet and on the north slope, December 11-20, at 5,000 to 6,000 feet.

Salt Draw, Chaves County. North of Roswell. [Ligon, June 16-20, 1918, May 30, 1924.]

Salt Marsh, Otero County. An alkali flat 20 miles west of Tularosa, a station on the Southern Pacific Railroad. Gaut, December 5, 1902.

San Andres Mountains, Socorro and Dona Ana Counties. A low range of mountains extending from Capitol Peak in the north to San Augustine Peak in the south, the center of which is 40 miles west of Alamogordo, a station on the Southern Pacific Railroad. Extensive collections were made by Gaut in these mountains, his principal stations being in the northern part of the range at Salinas Peak, December 6-20, 1902; Sheep Mountain, December 21; on the eastern slope about the middle of the range, January 11-12, 1903; Rhode Canyon, January 15; Beard Ranch, January 16; Bear Canyon, January 17-22; Gold Camp, January 23.

San Antonio Creek, Sandoval County. A stream in the Jemez Mountains. The Baileys camped September 5, 1906, on this stream at Valley Santa Rosa, 25 miles west of Espanola; 8,500 feet.

San Antonio River, Rio Arriba County. Rises in the eastern side of the San Juan Mountains and flows northeast into Colorado, crossing the boundary 15 miles west of the Rio Grande. Baileys, September 5-6, 1904.

San Augustine Plain (called on the Land Office map, Plains of San Augustine), Catron and Socorro Counties. A high plateau with the lower part 12 miles northwest of Monica Spring, 7,000 feet, and the highest near Monica Spring, about 7,800 feet. Hollister crossed the northern end October 3-4, 1905, on his way from Magdalena to Datil and recrossed it October 17-18; Goldman spent September 15-26, 1909, in exploring various parts of the plains in the vicinity of Monica Spring and on September 27 crossed at 8,000 feet the extreme southern rim forming the divide between this and the valley of the Rio Alamosa.

Sandia Mountains, Bernalillo County. A short high range 15 miles northeast of Albuquerque. Gaut's camp of December 29, 1903-January 1, 1904, was in Bear Canyon among the western foothills at the south end, 6,700 feet; Bailey's notes on the Sandia Mountains refer to the extreme eastern side of the mountains between San Pedro and South Mountain [Ligon visited the west slope June 23, 1919].

San Diego Canyon. See San Isidro.

San Francisco Canyon, Catron County. The canyon begins about 5 miles above Alma and extends approximately 20 miles up the river. The Baileys camped in the canyon at 5,800 feet, 6 miles below Frisco October 13, and 6 miles above Alma, October 14, 1906.

San Francisco Mountains (called on the Land Office map San Francisco Range), Catron County. A low range extending northeast and southwest between the upper waters of the San Francisco River and the Arizona line; the middle of the range is 25 miles north of Alma and 10 miles east of the Arizona line. Bailey and

Birdseye camped the night of September 3, 1908, on the top of the range at 8,600 feet, 6 miles east of Luna.

Sangre de Cristo Range. The southern end of the Rocky Mountains extending from the Colorado line south to Glorieta. See Pecos Baldy Peak, Taos Mountains and Truchas Peaks [Ligon, June 20-July 19, 1919].

San Isidro, Sandoval County. On Jemez Creek, 20 miles northwest of Bernalillo and 4 miles down stream from Jemez Pueblo; 5,000 feet, Baileys, September 10-11, 1906.

San Juan Mountains, Rio Arriba County. A long high range extending into northern New Mexico from Colorado and crossing the boundary about 20 miles west of the Rio Grande. The general level of the plateau forming the height of land is about 10,000 feet. The range was crossed by the Baileys near Hopewell, and they spent September 7-11, 1904, investigating the fauna of the higher slopes.

San Luis Mountains, Hidalgo County. The highest range crossed by the International Boundary; the larger part of the mountains is in Mexico; the highest point where they are crossed by the International Boundary is 6,700 feet. The mountains end a few miles north of the boundary at San Luis Pass, 5,600 feet, and thence northward are called the Animas Mountains. Mearns made extensive collections in these mountains; his main camp on the east side was at San Francisco Canyon, 5,900 feet, 5 miles south of Monument No. 63, while his main camp on the west side was at San Luis Springs, now known as Lang Ranch, 5,200 feet, on the New Mexico side of the boundary at Monument No. 66. From these camps trips were made to various parts of the mountains and to the summits during parts of June and July, 1892, and August 31 to October 2, 1893. Bailey and Goldman made camp also at Lang Ranch, August 10, 1908, and Goldman explored the mountains in Chihuahua August 11, up Devils Canyon to 7,200 feet and the next day to the top of the range at 8,000 feet; August 16-17 they worked in the foothills of the San Luis Valley on the south side of the boundary.

San Luis Pass, Hidalgo County. Crossed by Bailey August 11, 1908, and by Goldman August 19, 1908.

San Marcial, Socorro County. On the Rio Grande, 25 miles south of Socorro, 4,500 feet; Abert, November 15 to December 15, 1846, camped near here at a place which he calls Valverde. Evermann and Jenkins, early July, 1887; Loring, January 24, 1894; Bailey, July 31, 1908.

San Mateo Mountains, Socorro County. A range composed of two almost distinct parts, the northern extending east and west with the middle about 20 miles south of Monica Spring, its highest peak, Mount Withington, rising to 10,000 feet. The other part of the San Mateo Mountains is a short north and south range rising to the same height at the southern end in San Mateo Peak. The northern part of the range was explored by Goldman, September 10-11, 1909, from his base camp at Monica Spring, whence he ascended to the top of the range by way of Monica Canyon, reaching an altitude of 9,800 feet, a mile from Mount Withington. The southern part of the range was visited by him, October 3-7, 1902, from a base camp in San Mateo Canyon, 6,000 feet, and 8 miles from the mouth of the canyon at Ojo Caliente on the Rio Alamosa; he climbed San Mateo Peak, October 4 and 5.

San Mateo Mountains, Valencia County. These so-called San Mateo Mountains are really one enormous extinct volcano, called Mount Taylor, the highest point of which is 11,385 feet. Hollister made his base camp at 8,700 feet, 10 miles northwest of Seboyeta and collected August 13-17, 1905, from 7,500 to 11,000 feet.

The Baileys camped on the south base 4 miles north of Cubero September 20-23, 1906, and Bailey climbed Mount Taylor, September 21.

San Miguel, San Miguel County. A small town on the Pecos River near Ribera, and 20 miles southwest of Las Vegas. The Baileys were near here June 30, 1903.

San Pedro, Santa Fe County. On the northeastern slope of the Sandia Mountains, 25 miles northeast of Albuquerque; 8,000 feet. Bailey made his base camp at San Pedro, July 1-15, 1889, and collected here and about 10 miles east of the true Sandias on South Mountain.

San Rafael, Valencia County. Near the site of Old Fort Wingate, 4 miles south of Grant, a station on the Santa Fe Railroad. Bailey, October 26-November 1, 1908.

San Simon Marshes, Hidalgo County. About eight miles north of Rodeo, near the Arizona line. [Ligon, May 9, 1920.]

Santa Barbara River. A branch of the Rio Grande, heading on the north side of the Truchas Peaks and flowing northwest, joining the Rio Grande near Rinconada. [Ligon, June 1919.]

Santa Clara Canyon, Sandoval County. The exploration of the Jemez Mountains by the Baileys was made by way of the Canyon of Santa Clara Creek, August 20-September 5, 1906. Their first camp, August 20-21, was at 7,000 feet on the creek, 15 miles west of Espanola on the Rio Grande. The camp of August 21-23 was 3 miles up the creek at 7,300 feet; the next one, two days later, 2 miles higher up at 7,500 feet. August 27 they moved 5 miles higher to 8,500 feet and September 3, 3 miles still higher to 9,000 feet and Bailey collected thence to the top of Goat Peak at 10,400 feet. On September 21 he climbed Santa Clara Peak, 11,000 feet.

Santa Clara Peak, Sandoval County. See Santa Clara Canyon.

Santa Fe, Santa Fe County. The capital of New Mexico; 7,000 feet. Gambel, July-August, 1841, or 1842; Emory, August 18-September 2 and September 11-26, 1846; Abert, September 27-29, October 2-8, December 23-25, 1846; McCall, April-September, 1850; Woodhouse, summer of 1851-August 15; Henshaw, June 1874; Merriam, May 6, 1903; Baileys, July 5-7, 1903; [Jensen, northern Santa Fe County, 1918-1928].

Santa Rosa, Guadalupe County. The county seat, on the Pecos River at the crossing of the Southern Pacific Railroad; 4,600 feet. In 1902, September 24 (Bailey); September 26-October 11 (Gaut); September 27-28 (Hollister). The Baileys worked in the vicinity of Santa Rosa, May 19 to June 29, 1903; collecting near Santa Rosa May 19-23, at Mott's Ranch, 8 miles north of town, 6,400 feet, May 23-30, and at Santa Rosa Wells, 3 miles east of town, 4,750 feet, May 30 to June 9; Ligon, July 3-7, 1913.

Santa Rosa Wells, Guadalupe County. See Santa Rosa.

San Ysidro. See San Isidro.

Sapello Creek, Grant County. A branch of the Gila, entering that river from the east and passing through the G. O. S. ranch 25 miles north of Silver City. Bailey crossed this stream August 20, 1908, and camped on the north fork of the Sapello at 7,700 feet.

Sawyer, Valencia County. A lumbering camp in the Zuni Mountains on Blue-water Creek, 15 miles south of Thoreau and 20 miles west of Grant; from this point in August, 1911, Dearborn explored the Zuni National Forest from 8,000 to 9,000 feet.

Sawyer Peak, Sierra County. One of the highest peaks in the Mimbres Range, a few miles west of Kingston; about 10,000 feet. Climbed by Goldman the first week in November, 1909.

Separ, Grant County. Twenty miles southeast of Lordsburg, on the Southern Pacific Railroad. [Kellogg, June 15, 1924.]

Sheep Mountain, Socorro County. At the northern end of the San Andres Mountains, a few miles north of Capitol Peak. Gaut, December 21, 1902.

Shiprock, San Juan County. An Indian Agency in northwestern New Mexico, on the San Juan River, 15 miles from the Colorado line and an equal distance from Arizona. Gilman lived here February 1–September 1, 1907, and made extensive observations on the birds of this place and the neighboring Chuska Mountains; Birdseye was here part of the time, October 14–November 14, 1908.

Sierra Blanca (also called White Mountains), Otero County. The middle part of the Sacramento range; its highest point, Sierra Blanca Peak, 11,880 feet, is 15 miles east and a little north of Salinas, a station on the Southern Pacific Railroad; ascended by Bailey September 13, 1902, from his camp at 7,200 feet on Ruidoso Creek, 6 miles above Ruidoso.

Sierra de los Caballos, Sierra County. A short range of low mountains rising from the eastern side of the Rio Grande, a few miles north of Garfield. Visited by Goldman, November 17–21, 1909.

Sierra Grande, Union County. A high crater rising nearly to 11,000 feet, 10 miles south and a little east of Folsom, a station on the Colorado and Southern Railroad. Howell's base camp was on the southeast side at about 6,500 feet; he collected on the mountain August 17–21, 1903, and ascended nearly to the summit August 20.

Silver City, Grant County. The county seat and a station on the Santa Fe Railroad; 5,800 feet. Marsh lived here November, 1883, to June, 1884, and collected very extensively in the vicinity of the town and in the Pinos Altos Mountains, a short distance to the northward. Fisher, June 27 to July 12, 1894, collected from 6,000 to 8,000 feet in the Pinos Altos Mountains; Hunn, September 1–May 6, 1903 and 1904–5; Baileys, November 10–11, 1906, and Bailey, August 14–19, 1908, on August 15 going to the base of Pinos Altos; Goldman, September 14, 1908; [Kellogg, since 1912, has been collecting within a radius of twenty miles of Silver City.]

Silver Springs Canyon, Otero County. In the Sacramento Mountains. Bailey and Hollister camped the night of September 8, 1902, in the canyon at 8,700 feet, 4 miles north of Cloudercroft and the next night at the junction of Silver Creek and Elk Creek, 7,800 feet, 6 miles down stream from Elk Springs.

Socorro, Socorro County. On the Rio Grande; 4,600 feet. Loring, January 22–23, 1894; Goldman, most of August 11–26, 1909; [Ligon, July 14, 1918].

Socorro Mountains, Socorro County. A low range a few miles east of Socorro; explored by Goldman, August 26, 1909, to the summit at 7,200 feet.

Solitario Peak, San Miguel County. About 30 miles northwest of Las Vegas. Bailey, September 4, 1903.

Staked Plains, Quay County. An extension of the Staked Plains plateau of Texas passes for a short distance into New Mexico. On June 18, 1903, the Baileys visited the highest point, 5,850 feet, 6 miles west of Montoya.

Stinking Spring Lake. See Burford Lake.

Tajique, Torrance County. A town on the eastern slope of the Manzano Mountains, 30 miles southeast of Albuquerque; 7,500 feet. Gaut made his base camp near this place December 15-22, 1903, and collected near here from 7,800 to 9,500 feet.

Taos, Taos County. A town 4 miles from the Taos Pueblo, the principal pueblo of the State; 7,000 feet. The Baileys passed through September 21, 1903, and outfitted July 8-11, working from a base camp a mile beyond, at the foot of the mountains, July 11-19, 1904. [Ligon was there June 19, 1919.]

Taos Creek. See Pueblo Creek.

Taos Mountains, Taos County. The name applies locally to that part of the Sangre de Cristo range lying between the Culebra Mountains to the north and the Truchas Mountains to the South. This range contains the highest peak in the State, to which the name, Wheeler Peak, should be applied; about 13,600 feet. Bailey collected in these mountains September 15-20, 1903, climbing Taos Mountain on September 17 by way of Elizabethtown and on September 25 going up Hondo Canyon to the west base of Wheeler Peak. The following year, the Baileys made their base camp, July 20-August 2, at the head of Lake Fork at the west base of Wheeler Peak, 11,400 feet; this camp being called in their notes, Wheeler Amphitheater. They made many trips from here to the top of Wheeler Peak and to some of the highest of the neighboring peaks.

Taos Pass, Taos and Colfax Counties. The lowest pass in the Taos Mountains, 15 miles directly east of Taos Pueblo; 9,100 feet. The Baileys camped September 12-15, 1903, 1 mile east of the pass and 300 feet below its summit; going on through the pass, September 20.

Taos Peak, Taos County. The peak to which this name should be applied is 2 miles southeast of Wheeler Peak and just north of Blue Lake; 13,400 feet. Bailey, July 21, 1904.

Tecolote, San Miguel County. A small town 10 miles south of Las Vegas; 6,500 feet. The Baileys were here, August 28, 1903.

Thoreau, McKinley County. A station on the Santa Fe Railroad; 7,000 feet; a logging road extends from here up into the Zuni Mountains. Bailey, November 1, 2, 3, 1908; Goldman, June 9-12, 27-28, and July 29-30, 1909.

Thornton, Sandoval County. A station on the Santa Fe Railroad, near the Rio Grande, 35 miles north of Albuquerque; 5,200 feet. Jones and Dawson, June 30-July 1, 1900.

Tierra Amarilla, Rio Arriba County. The county seat, on the Big Chama River, 20 miles from the Colorado line; 7,700 feet. Baileys, September 12-14 and 25, 1904.

Tres Piedras, Taos County. A station on the Denver and Rio Grande Railroad, 22 miles south of the Colorado line; 8,000 feet. Baileys, October 1-2, 1903; Gaut, July 30-August 3, 1904; [Ligon, in Carson Forest west of Tres Piedras, May 4, and June 6, 1916].

Truchas Peaks, Santa Fe and San Miguel Counties. A local name given to the group of mountains about 4 miles northeast of Pecos Baldy at the southern end of the Sangre de Cristo range. The highest peaks are 13,275 and 13,300 feet. One of them was climbed by the Baileys, August 11, 1903, and both by Bailey, August 12, 1903. [Visited by Ligon, July 12, 17, and 18, 1919.]

Tucumcari, Quay County. A station on the Southern Pacific and the Chicago, Rock Island, and Pacific Railroads, 55 miles northeast of Santa Rosa; 4,200 feet. Baileys, June 17, 1903; Weller, June 18, 1903.

Tularosa, Otero County. A station on the Southern Pacific Railroad, 10 miles north of Alamogordo; 4,400 feet. Gaut made this his base camp, November 4–December 4, 1902, making trips eastward to the foothills of the Sacramento Mountains and to the flat country for 10 miles north and south and 20 miles west.

Tunicha Mountains, San Juan County. A range of mountains rising to 8,500–9,000 feet near the north end of the Chuska Mountains. Bailey visited these mountains October 8, 1908, and on October 12 followed down Tunicha Creek to the Chaco River and camped that night at an Indian settlement at 5,300 feet.

Tusas, Rio Arriba County. A small town near the summit of the main range of the San Juan Mountains, 20 miles south of the Colorado line, and 25 miles east of Tierra Amarilla. The Baileys camped the night of September 6, 1904, at 8,650 feet at the fork of the Tusas River, a few miles above the town.

Twining, Taos County. A mining town on the Hondo at 9,800 feet, near the source of this stream. Baileys, September 25, 1903; Surber, October 7–26, 1903, collected near here at 10,000 to 12,500 feet and on December 14, at 9,800 feet; the Baileys passed through here July 20, 1904, on their way to Wheeler Peak, and on their return camped August 2–8 in a meadow 2 miles above Twining at 10,700 feet.

[Uraca Canyon, Colfax County. About 9 miles southwest of Cimarron. Ligon, June 16, 1924.]

Valdez, Taos County. A Mexican town on the Hondo, 7 miles from its mouth, also called San Antonio; 7,700 feet. Baileys, August 9, 1904.

Valle Santa Rosa, Sandoval County. In the Jemez Mountains on San Antonio Creek at 8,500 feet, one-half mile above the mouth of La Jara Creek and 25 miles west of Espanola. Baileys, September 5–8, 1906. Pelado Peak was climbed from this camp.

Vaughn, Guadalupe County. At the junction of the Southern Pacific and Santa Fe railroads. [Ligon, May 29 and 30, 1924.]

Vermejo Valley, Colfax County. A valley or park near the headwaters of Vermejo River, 30 miles west of Raton, and 5 miles from the Colorado line. Howell entered this valley September 21, 1903 and camped that night 3 miles above Vermejo post office; the next night at 9,000 feet northeast of Costilla Peak, remaining till September 25. He passed through the valley again on his return trip, September 27.

V + T Lake (formerly called Beaver Lake), Catron County.

V + T Ranch (now Beaverhead), Socorro County. A large ranch 20 miles west and a little north of Chloride on the upper waters of the Gila River, in the northwest corner of T. 10 S., R. 12 W. Bailey, August 26, 1908; Ligon collected near here at various times January–May, 1913, at 7,000 to 7,200 feet. Beaver Lake is on this ranch, 2 miles above the ranch buildings.

Walnut Wells, Hidalgo County. In the Playas Valley, between the Animas and Hatchet Mountains, about thirty miles southwest of Hachita. [Ligon, May 6, 1920.]

Water Canyon, Socorro County. A large canyon in the Magdalena Mountains. Goldman's base camp, August 27 to September 5, 1909, was at the mouth of this

canyon, 6,500 feet, 15 miles southeast of Magdalena and 10 miles west of Socorro. From here collections were made up to 10,000 feet in the Magdalena Mountains.

Weed, Otero County. A small town in the eastern foothills of the Sacramento Mountains; 7,200 feet. Bailey and Hollister, September 5, 1902.

Wheeler Peak (called Taos Peak on the Land Office map), Taos County. The highest peak in New Mexico, 13,600 feet (aneroid), 17 miles northeast of Taos Pueblo. The Baileys base camp of July 20–August 2, 1904, was on the lake at the west of this peak, 11,400 feet, and was called Wheeler Peak Amphitheater. The peak itself was climbed July 21, 25, 26, and 27.

White Lake, Chaves County. About 30 miles northeast of Roswell. [Ligon, June 6, 1924.]

White Mountains. See Sierra Blanca.

Whitewater, Grant County. Two miles south of Monument 61, Mexican Boundary Survey, 153 miles west of the Rio Grande, 5,000 feet. Mearns, part of May 30–June 29, 1892, and part of September 10–23, 1893.

Whitmire Ranch, Hidalgo County. On the east side of Playas Lake, at about 5,000 feet. Bailey camped there the night of August 5, 1908.

Willis, San Miguel County. On the Pecos River at about 7,800 feet, 23 miles above the town of Pecos. The Nelson brothers lived here in 1883 and Henshaw was here with them July 18–August 28, 1883; Birtwell, 1901. The Baileys camped July 18–21, 1903, 1 mile above Willis post office at 8,100 feet (see Cowles).

Willow Creek, Catron County. One of the upper branches of the middle fork of the Gila. The Baileys' base camp, August 18–30, 1906, was at 8,500 feet, about 15 miles east of the town of Mogollon; Goldman camped near here October 21–29, 1908; each used these camps as the base for exploring the Mogollon Mountains.

Wingate, McKinley County. A station on the Santa Fe Railroad, 30 miles east of the Arizona line, 7,000 feet; Fort Wingate lies 3 miles to the southward. Hollister, June 18–26 and June 28, 1905.

Zuni, McKinley County. A town on the Zuni River, 20 miles from Arizona; the headquarters of the Zuni Indians and near the old Zuni Pueblo. Woodhouse, September 1–24, 1851; Kennerly, November 20–28, 1853; Aiken, June, 1876; Bailey, September 21–22, 1908.

Zuni Mountains, McKinley and Valencia Counties. A large range extending northwest and southeast with the middle of the range 25 miles northeast of Zuni. Hollister explored these mountains July 17–24, 1905, coming in from Grant, a station on the Santa Fe Railroad, and making his base camp at Agua Fria Spring, 8,000 feet; Bailey made a trip to the mountains, November 2, 1908, by way of Thoreau, Kettner and Copperton; Goldman came in from Thoreau, a station on the Santa Fe Railroad and made his base camp at McGaffey 6 miles southwest of Mount Sedgwick near the head of Bluewater Creek, 8,500 feet, June 13–26, 1909.

Zuni River, McKinley and Valencia Counties. One of the principal rivers of western New Mexico, crossing the Arizona boundary a few miles south of latitude 35 degrees. Bailey camped on the river the night of September 21, 1908, close to the Arizona boundary.

GLOSSARY OF TECHNICAL TERMS NOT ON TOPOGRAPHY
OF A BIRD¹

[After Ridgway's Nomenclature of Colors, First Edition, pp. 61-118, 1886.]

Adult: A bird which has reached fully mature or final plumage.

Asymmetry: Lack of symmetry on opposite sides, as in the skulls of some owls.

Axillaries: A more or less distinct tuft of feathers, usually soft and elongated, growing from the armpit or axilla.

Bars: Lines across the body (see Stripes).

Bend of the Wing: The front projection of the folded wing.

Cere: The naked skin, membrane, or wax-like swelling, in which the nostrils are situated, as in birds of prey and pigeons.

Crepuscular: Birds which become active during twilight, as nighthawks and whip-poor-wills.

Crest: A more or less lengthened, erectile, or permanently erect tuft of feathers on top of the head.

Crissum: The feathers between the lower tail coverts and the anal region.

Dichromatism: Two color forms of one bird, as the rufous and gray screech owls, or white, blue, or dusky forms of some herons.

**Disc
Disk** } : A set of radiating feathers surrounding the eye, as in the owls.

Dorsal: Pertaining to the back.

Down: Small, soft, decomposed feathers which clothe the nestlings of many birds, and which also grow between and underneath the true feathers in many adults, especially waterfowl.

Ear-tufts: Erectile tufts of elongated feathers on each side of the crown, suggesting the external ears of many mammals; especially characteristic of the owls.

Edge of the Wing: The anterior border of the wing.

Ferruginous: Rust-red.

Gape: The opening of the mouth.

Gorget: An ornamental throat patch, distinguished by color or texture, as the gorget of a hummingbird.

Hooded: Having the head conspicuously different in color from the rest of the plumage; as in some gulls.

Immaculate: Without spots or markings.

Immature: Not adult.

Insectivorous: Feeding upon insects.

Interscapulars: The feathers between the scapulars—on the back.

Iridescent: With changeable colors which vary according to the light.

Iris: The colored circle surrounding the black center or pupil of the eye.

Juvenal: In plumage, that following the nestling down.

¹Topography of a Bird, p. 72.

Lanceolate: Lance-shaped; tapering gradually to a point.

Lining of the Wing: The under wing coverts.

Lobate }
Lobed } : With membranous flaps, as the toes of a coot.

Mantle: In the gulls and some other birds, the mantle, applied to the plumage of back, scapulars, and wings, differing from the adjoining parts and uniform in color, suggesting a mantle thrown over the body.

Masked: Having the anterior part of the head colored differently from the adjoining plumage.

Melanistic: A state of coloration resulting from excess of black or dark pigment, in which the normal colors are replaced by black or dusky as in some hawks.

Metallic: Applied to colors having a brilliant appearance, like burnished metal.

Migration: Periodic, spring and fall, usually north or south movements.

Mirror: A name sometimes given to the speculum or metallic wing band in ducks.

Monochromatic: Having only one color form, in distinction to dichromatic.

Monogamous: Birds which pair, or have a single mate in a season.

Moustache: Any conspicuous stripe on the side of the head beneath the eye.

Nail: Overhanging tip of bill, as in some ducks.

Nostril: The opening in the upper part of the bill.

Nuchal: Pertaining to the nape.

Nuptial plumes: Ornamental feathers acquired at the approach of the breeding season and lost at its close.

Occipital: Pertaining to the hind-neck or occiput.

Orbital ring: A ring of color immediately encircling the eye.

Palate: The roof of the mouth.

Passerine: Relating to an order of land birds including the most highly developed birds, such as crows, thrushes, warblers, sparrows, etc., but not the swifts, hummingbirds, kingfishers, woodpeckers, etc.

Pectinate: Having tooth-like projections like the teeth of a comb, as in the toes of grouse.

Pectoral: Relating to the breast.

Polygamous: Mating with many females, as the domestic cock.

Quill: One of the primaries.

Raucous: Hoarse voiced.

Recurved: Curved upward.

Rufous: Brownish red.

Serrate: Toothed like a saw.

Spatulate: Spoon or spatulate-shaped.

Species: Related individuals with differences that distinguish them from others.

Speculum: A mirror-like or brightly colored band, usually across the secondaries, on the wings of certain ducks.

Stripes: Lines running vertically (lengthwise) instead of horizontally across the body of the bird (see Bars).

Superciliary: A streak of color over the eye.

Under tail coverts: The feathers at the under base of the tail.

Under wing coverts: The coverts of the under surface of the wing, or wing linings.

Vermiculated: Marked with irregular fine lines, like the tracks of small worms.

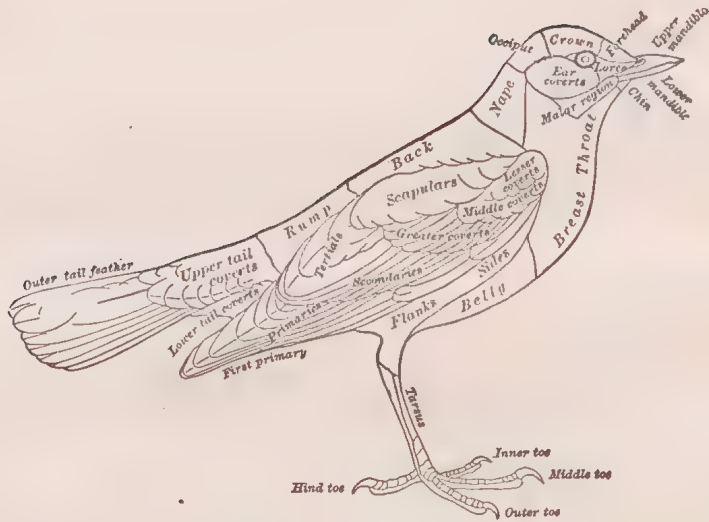
Washed: Thinly overlaid with a different color.



Measurement of Bill



Measurement of Tarsus



TOPOGRAPHY OF A BIRD

BIRDS OF NEW MEXICO

By FLORENCE MERRIAM BAILEY

With State Records by WELLS WOODBRIDGE COOKE

LOONS: Order Gaviiformes

LOONS: Family Gaviidae

The Loons are web-footed divers with straight, sharp-pointed bills, long bodies, strong wings, and short tails. They can change their specific gravity by inhaling or expelling the air from their lungs and air-sacs.

LOON: *Gavia immer* (Brünnich)

DESCRIPTION.—*Length*:¹ 28-36 inches, wing 13-15.2, bill 2.7-3.5 (tail 2.6-4 Forbush). *Adults in summer plumage*: Head and neck greenish black, neck with series of parallel white lines; back and wings black, spotted and barred with white; underparts mainly white; iris red, bill black, legs and feet black and bluish gray. *Adults in winter plumage*: Generally dark brown or blackish above with no light



From Biological Survey

FIG. 1. Loons

Our wild-voiced visitors from the north

feather edgings; back with faint suggestion of white spotting; chin, throat, and underparts mainly white; iris reddish brown, bill and feet lighter than in summer. *Young in first winter plumage*: Upperparts blackish brown, with broad light gray feather edging; throat and breast often mottled; iris brown, bill smaller than in adult and never black.

RANGE.—Northern part of Northern Hemisphere. In America breeds from Kotzebue Sound and Arctic coasts and islands, including northern Greenland, south to Massachusetts (rarely), northern parts of New York, Iowa, in Wyoming, and California; winters from British Columbia (on salt water), Great Lakes, and Maine to Florida, the Gulf Coast, and Lower California.

¹Measurement of bird from tip of bill to tip of tail.

STATE RECORDS.—The Loon, breeding in the north and passing through New Mexico in migration, has been recorded near Las Vegas (Atkins, 1894, p. 77) and taken October, 1854, at Fort Thorn (Henry). It was also noted November 14-16, 1846, near Socorro (Abert). On the Carlsbad Bird Reserve it was reported February 18, 1914 (Wilder). [On the Rio Grande Bird Reserve, two were seen November 28, and one December 6, 1916 (Willett).]—W. W. COOKE.

NEST.—Close to water, preferably on an islet, but sometimes on drift or a muskrat house, and often in flags; at times merely a depression, at others a bulky mass of flags and sedge. *Eggs*: Two, grayish olive-brown, thinly spotted with blackish, occasionally with heliotrope shell marks.

GENERAL HABITS.—Large and conspicuously marked, when not living on unfrequented fresh-water rivers and lakes the Loons resort to large bodies of water, where by diving and swimming long distances under the surface they are able to elude all enemies. Here, sometimes on the floor of an islet, sometimes in the hollowed-out top of a nearly submerged muskrat house, they lay their eggs and hatch their two young, ready, on alarm, to drop off into the water and swim away.

As they migrate by day they are among the rare, delightful possibilities of the observer in New Mexico. Flying high, usually singly or in pairs, they may be distinguished from the Canada Geese by their snowy underparts, straight flight, and their characteristic loud wild "*wah-ho-o*," given as they pass swiftly on.

ADDITIONAL LITERATURE.—BEEBE, WILLIAM, Auk, XXIV, 34-41, 1907 (loon chicks).—BENT, A. C., U. S. Nat. Mus. Bull. 107, 47-60, 1919.—BREWSTER, WILLIAM, Bull. Mus. Comp. Zool. Harvard, LXVI, 43-53, 1924.—JOB, H. K., Among the Water-Fowl, 43-49, 1902.—NORTON, A. H., Educational Leaflet 78, Nat. Assoc. Audubon Soc.—SIM, R. J., Bird-Lore, XXV, 167-175, 1923.—TAVERNER, P. A., Birds of Western Canada, 39-41, 1926.

PACIFIC LOON: *Gavia ártica pacífica* (Lawrence)

DESCRIPTION.—*Length*: About 24 inches, wing 11.2-12.2, bill 2-2.3. *Adults in summer plumage*: Similar to that of the Loon, but *top and back of head and neck* smoke gray or whitish, and back black with four series of white bars. *Adults in winter plumage*: Back brownish with white markings absent or only suggested, throat and sides of head to nape white, usually with brown lines across upper throat. *Young in first winter plumage*: Similar to winter adults but back "*scaly*" from broad gray feather margins, and throat and sides of head streaked or mottled.

RANGE.—In America breeds from Bering Sea, northwestern Alaska, and Melville Peninsula south to Hudson Bay, southern Mackenzie, and British Columbia (summer records perhaps only non-breeding birds); winters mainly along the Pacific coast from British Columbia to Lower California; casually in New Mexico, Arizona, and northeastern part of United States (also Pacific coast of Asia).

STATE RECORDS.—The Pacific Loon is a western species breeding in the Arctic regions and wintering on the Pacific coast, but an accidental visitant was taken in November, 1899, near Clayton and is now preserved in the museum of the Agricultural College at Fort Collins, Colorado.—W. W. COOKE.

GENERAL HABITS.—The Pacific Loons are said to reach their breeding places in the Barren Grounds and on the shores of the Arctic Sea

in June, and to leave them in September, so if any stragglers are to be looked for in New Mexico it will be before and after these dates.

It is interesting to hear that spring migrants have been sighted by Mr. Huey in Lower California about sunrise apparently headed straight for long stretches of torrid deserts and high mountain ranges, which would have to be crossed before they could reach the Pacific, about a hundred miles away (1927, pp. 530-531).

GREBES: Order Colymbiformes

GREBES: Family Colymbidae

The Grebes are lobe-footed divers, the scalloped flaps hinged to the toes making good paddles for the stroke and folding away to offer minimum resistance on the return (Taverner). They have weak wings and rudimentary tails. Like the Loons they can sink under water merely by expelling the air from their lungs and air-sacs. Their stomachs, in spring at least, usually contain a mass of their own feathers, probably swallowed during the molt. Their white-tipped secondaries give a white border to the spread wing absent in the Loons. Their interesting courtship performances are not fully known and should be given careful study.

REFERENCES.—BENT, A. C., U. S. Nat. Mus. Bull. 107, 1-47, 1919.—HUXLEY, J. S., Auk, XXXIII, 256-270, 1916.—THAYER, G. H., Concealing-Coloration in the Animal Kingdom, Figs. 77 and 80, pp. 82-83, 1909.—TOWNSEND, C. W., Auk, XLI, 29-41, 1924 (diving).—WETMORE, ALEXANDER, U. S. Dept. Agr. Bull. 1196, 1924 (food); Condor, XXII, 18-20, 1920 (feather eating).

HORNED GREBE: *Colymbus auritus* Linnaeus

DESCRIPTION.—*Length*: 12.5-15.2 inches, wing about 5.7, bill about .8-1, bill higher than wide at base. *Adult summer plumage*: Puffy cheeks and head black, with erect buffy brown side crests or horns; lores reddish; upperparts blackish; foreneck, chest, and sides reddish brown; breast and belly white; iris red, with white rings; bill mainly black, feet dusky and yellowish. *Adult winter, and juvenal¹ plumage*: Crests scant or wanting; upperparts grayish black; the young with white of cheeks nearly meeting on hindneck; underparts silvery white; dusky markings on sides of head and throat.

RANGE.—Northern parts of Northern Hemisphere. In America breeds from the Lower Yukon, northern Mackenzie, Hudson Bay, and Magdalen Islands south to Maine, Minnesota, northern Nebraska, northern Montana, and the interior of British Columbia; winters from southern Alaska, Great Lakes, southern Ontario, and Maine south to Florida, the Gulf Coast, and southern California.

STATE RECORDS.—On November 27, 1916, Willett found a dead grebe floating on the lake at Elephant Butte which he says "from the dimensions of its bill, was undoubtedly referable to *auritus*." This, apparently, is the only record for the State.

ADDITIONAL LITERATURE.—DUBOIS, A. D., Auk, XXXVI, 170-180, 1919 (nesting).

¹ The term juvenal is used for the first plumage after natal down.

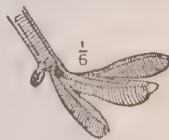


FIG. 2. Foot of Grebe

AMERICAN EARED GREBE: *Colymbus nigricollis californicus* (Heermann)

PLATE 3

DESCRIPTION.—*Length:* 12-14 inches, wing 5.2-5.5, bill about .8-1. *Bill wider than high at base.* *Adult summer plumage:* Median crest, head and neck black, drooping ear tufts golden brown or tawny; back blackish, wings with white patch; sides brown,



Photograph by Robert B. Rockwell

FIG. 3. Nest of Eared Grebe
Among the cat-tails and tules

breast silvery white; iris red, eyelids orange. *Adult winter and young plumage:* Ear tufts wanting; upperparts and sides slaty (young browner and colors duller); throat and underparts white.

COMPARISONS.—The Horned and Eared Grebes are difficult to distinguish in the winter and young plumages except by the shape of the bill (see p. 75).

RANGE.—Western North America. Breeds from southern interior of British Columbia, Great Slave Lake, and Manitoba south to northern Iowa, northern New Mexico, northern Arizona, and Lower California; winters from Washington, Nevada, and Texas, but especially Pacific coast south to Cape St. Lucas and Guatemala.

STATE RECORDS.—The Eared Grebe is a western species, breeding abundantly east to Colorado and rarely to Iowa and south to New Mexico and northern Arizona. It is a common breeder in the San Luis Valley of Colorado just north of the New Mexico line, and is supposed to be equally common in northern New Mexico.



From Handbook of Birds of the Western United States
THE GENTLE EARED GREBE

When Lake Burford,¹ on the Jicarilla Apache Reservation at 7,500 feet, was first visited by Ligon July 19-20, 1913, a large colony of these birds was located. The nests occupied an area in the tules about 150 feet long by 25 feet wide, about 25 feet from land, and were floating in water, 2-4 feet deep. A count showed about 250 nests in the colony containing from 1 to 6 eggs, with three as the usual complement. Many birds were seen at the other end of the lake, but no other nests were found. On July 26, Horse Lake about 12 miles north was visited, and by this time most of the eggs had hatched, and old birds with one to three young were common. Some of the young were half grown. On August 1, Lake Burford was revisited, when the eggs in the nests of July 19-20 were all hatched, but the colony had been extended each way by the addition of fully a hundred nests, many of which contained fresh eggs. On a third visit to Lake Burford, August 11, a new colony was found three-fourths of a mile from the earlier colony. This second colony was scattered along for half a mile through the tules in four feet of water and contained at least 300 completed nests and many more in process of construction. Most of the eggs were fresh and in sets of 1-4. [On a fourth visit to the lake, in the summer of 1916, Ligon estimated about 250 pairs of Eared Grebes. In 1918 while Dr. Alexander Wetmore was visiting the lake, the Grebes, common earlier, suddenly increased in abundance between May 30 and June 1, becoming the most abundant of the breeding marsh birds on the lake.]

More extended observations would undoubtedly reveal the presence of these birds at several other places in the State, but at the most only a small part of New Mexico furnishes congenial conditions. A single pair was noted in the summer of 1898 on a small alkali lake at 7,000 feet near Las Vegas (Mitchell). [In June, 1918, they were found nesting in fair numbers on two lakes at 9,000 feet in the southern end of the Chuska Mountains, a colony of about forty nests being examined July 1. About two-thirds of the young had hatched (Wetmore).] A few breed south even to Mesilla, 3,800 feet, where they nest in some unfrequented ponds.

Between Socorro and Albuquerque a single bird was noted, August 28, 1917, but they are rarely observed in migration (Ligon).

Some may even winter at Mesilla, for they were noted on December 2, 1912, and again in February (Merrill). [Two were seen, December 9, 1918, on Cedar Lake, five miles northeast of Engle, a few days before the lake was frozen over (Ligon).] One specimen was taken at Bernalillo, October 28, 1900 (Birtwell). [On the Rio Grande Bird Reserve (Elephant Butte), the species was noted November 23-December 9, 1916, and on the Carlsbad Bird Reserve was reported as abundant December, 1916 (Willett).

[In spring, though they are rare at Silver City, one was taken on the Rio Mimbres, April 13, 1920 (Kellogg)].—W. W. COOKE.

NEST.—In large colonies, a floating or anchored mass of water soaked vegetation, on the shallow water of a pond or lake. Eggs: 4 to 6, dull white, more or less nest soiled.

FOOD.—Almost wholly animal matter, largely aquatic insects—sometimes about 90 per cent—including water boatmen, water bugs, etc.; also alkali flies, weevils, leaf-beetles, caterpillars, etc. The few small fish taken are apparently of little or no economic value. "The species is harmless to human interests" (Wetmore).

GENERAL HABITS.—The quiet little Eared or Black-necked Grebe with the "helmet-like crest" will often swim slowly along near shore or rest on the water returning your interested gaze as long as you will;

¹ Formerly Stinking Spring Lake.

but if you make a suspicious move, after turning alertly from side to side scrutinizing you, it will quickly curve forward and dive below, where it swims with both wings and feet under water.

In the Yellowstone, Mr. M. P. Skinner has found it common not only on alkali or reedy ponds but occasionally on running streams. At Mesilla Park, Professor Merrill says, this interesting bird may be met with commonly, summer and winter, in unfrequented ponds and shallows where the rushes and cat-tails are thick and extensive enough to afford seclusion and good feeding and nesting grounds.

At Lake Burford, in the summer of 1918, Doctor Wetmore wrote: "At dusk the birds gather in flocks on a broad open expanse to secure the ants and beetles, which, flying out from the sage-grown hills surrounding the lake, are entrapped and drowned in the water. Gnats and mayflies that emerge in myriads from the water also furnish an eagerly sought supply of food (1924, p. 17).

At the lake Doctor Wetmore says, small flocks containing unmated birds were found in open bays until June 2, but after June 5 they were always found in pairs. The courtship displays witnessed were of peculiar interest. In describing one of the most characteristic acts of the Eared, he wrote—"Suddenly the male assumed an attentive attitude facing the female with crest and cheeks flaring, head erect, neck extended slightly forward, wings half opened with the tips raised so as to display all of the handsome markings to the best advantage. The female then dove, remaining under twelve or fifteen seconds, while the male maintained his position, watching intently. As the female emerged she came up slowly a few feet away with head and neck extended until when free of the water she was standing bolt upright on the surface treading water rapidly with her whole body exposed. . . . On perceiving her [the male] rose assuming the same attitude as that held by his mate, and the two, still bolt upright, advanced slowly toward one another, until finally their breasts touched, when their feet, suddenly moving more rapidly, broke at the surface, making a great boiling in the water. This performance was accompanied by constantly varied trilling and whistling notes. The birds held this upright position for a few seconds with heads turning rapidly from side to side as if pivoted on the neck, then sank slowly down to the usual resting position on the water and at once began to preen the feathers of the sides of the breast and neck. . . . Rival males often threatened one another by half extending their wings and then closing them for two or three times as they faced one another, or ran at each other striking with their bills. . . . Females too fought to some extent when their mates paid attention to others. . . . Though these grebes were paired early, actual nest building did not start until about June 13. . . . Nests were begun where the water was from three to five feet deep. The females seemed to do

the work of nest construction, dragging up masses of algae to a certain point and diving actively for more while the males remained near the nest posturing over it, trilling, and reaching out over it as though to aid the female as she approached with building material" (1920a, pp. 231-234).

On large bodies of water, nests that are not anchored sometimes drift off during a storm. When surprised on the nest, the brooding birds hurriedly pull up the nest lining or drag up the stems of water weeds to cover the whitish eggs before leaving them, perhaps to keep them warm while the mother is away, perhaps to hide them from enemies such as gulls that slip in during the absence of the parent, to eat them.

When the eggs have hatched, Mr. Job says, it is an odd sight to see a "crop of little heads sticking out from under the parent's wing." As Mr. Ligon wrote from Horse Lake, the little fellows ride on the back of one parent while the other dives and brings up their food. When they are half grown they begin to dive, he says, but do not remain under water so long as the old birds. A half-grown family that I discovered in North Dakota were swimming well out on a large lake, but when their mother caught sight of me, she gave a harsh imperative *ka-keep'*, *ka-keep'*, and the scattered brood promptly started to swim toward her, making small wakes in the still water, her loud musical *hoy-ee-up'*, *hoy-ee-up'*, encouraging them as they swam.

Another grebe mother, found in September in the sooty and white fall plumage that makes it hard to distinguish the Eared from the Horned, was working hard to get the last meal of the day for her single little one, diving—by the watch—as many as six or seven times a minute, the young one sometimes putting its head under water between times as if even that rapid rate of feeding were not enough to satisfy its eager appetite.

Like the Western Grebe, the Eared was formerly killed in large numbers for its plumage, but as Doctor Wetmore puts it, fortunately laws and fashions changed in time to prevent its extermination (1924, p. 17).

ADDITIONAL LITERATURE.—FINLEY, W. L., Condor, IX, 99, 1907.—JOB, H. K., Among the Water-Fowl, 1-14, 1902.—ROCKWELL, R. B., Condor, XII, 188-193, 1910.—WETMORE, ALEXANDER, Auk, XXXVII, 231-235, 1920; U. S. Dept. Agr. Bull. 1196, 15-18, 1924 (food).

WESTERN GREBE: *Aechmóphorus occidentális* (Lawrence)

DESCRIPTION.—*Male*: Length 24-29 inches; wing 7.4-8.5; bill 2.6-3. *Female*: Smaller. Bill long and slender. *Adults*: Face, long neck, and underparts snow white; crown, and stripe down back of neck, blackish; back brownish gray; wing quills marked with white; iris pink or red, with a white ring. *Immature*: Back of head and hind-neck grayish black.

RANGE.—Western North America, particularly the lakes of the prairie regions. Breeds from British Columbia (summer birds perhaps only non-breeding birds), northern Alberta, north-central Saskatchewan, and central Manitoba south to east-central North Dakota, central Utah, and southern California; winters west and south of the Rocky Mountains, mainly on the Pacific coast, from southern British Columbia, western Nevada, southwestern Arizona (Gila River) south to southern Mexico; casual eastward.

STATE RECORDS.—The Western Grebe breeds mainly west of 100° in southern Canada and the northern United States and winters near the Pacific coast. It wanders occasionally eastward and one was taken in November, 1873, on the Gila River in New Mexico (Henshaw).—W. W. COOKE.

GENERAL HABITS.—The white-throated Western Grebe, or Swan Grebe, the largest and handsomest of this interesting family of divers, may be recognized across a good sized lake when seen only as a disappearing flash of white. So beautiful are the silky white feathers of its throat and breast that before the market for grebe skins was closed many of its large breeding colonies on western lakes were broken up by plume hunters, and thousands of these unusual birds, whose curious courtship and fascinating ways would have attracted nature lovers to their home-waters, were ruthlessly destroyed to meet the ephemeral demands of the millinery traffic.

ADDITIONAL LITERATURE.—BAILEY, F. M., Condor, XX, 170-178, 1918.—BENT, A. C., U. S. Nat. Mus. Bull. 107, 1-9, 1919.—CHAPMAN, F. M., Camps and Cruises of an Ornithologist, 302, 330, 349, 1908.—FINLEY, W. L., Condor, IX, 97-101, 1907.—JOB, H. K., Among the Water Fowl, 15-27, 1902.—WETMORE, ALEXANDER, U. S. Dept. Agr. Bull. 1196, 5-7, 1924 (food).

PIED-BILLED GREBE: *Podilymbus podiceps podiceps* (Linnaeus)

DESCRIPTION.—*Length:* 12-15 inches, wing 4.5-5, bill about .9. Bill short and thick, its ridge curved. *Adult summer plumage:* Upperparts brownish or blackish; throat black, breast brownish, belly white mottled with dusky; bill light colored, banded; iris brown and white, eyelids white, feet greenish black and leaden. *Adult winter and young plumage:* Throat white, without black patch, bill without band.

COMPARISONS.—In winter and young plumages, the short, strongly curved, "hen-like bill" and the absence of shining white cheeks distinguish the Pied-bill from the Horned and Eared Grebes. (See pp. 75, 76.)

RANGE.—Breeds from British Columbia, Great Slave Lake, Manitoba, Quebec, and New Brunswick south to Chile and Argentina, though often rare or local; winters from coast of British Columbia, Washington, New York, and the Potomac Valley south to Mississippi, Texas, Arizona, Lower California, and southward.

STATE RECORDS.—The Pied-billed Grebe ranges in summer over much of North and South America but is very irregular in its choice of localities for nesting. Half-grown young and nests with eggs were found at Lake Burford 7,500 feet, in Rio Arriba County, July 17, 1913, where the birds were fairly common; and on July 20, a nest was seen containing eight eggs and three newly hatched young; at Dulce Lake and Clear Lake they were also common; (they were found breeding fairly commonly at Lake Burford in July, 1916 (Ligon), and commonly on June 18, 1918, when a brood of newly hatched young was found (Wetmore). At Silver City they are found in

moderate numbers in spring and probably breed (Kellogg, 1927).] A single bird was seen June 2, 1903, on a pond near Santa Rosa (Bailey).

During fall migration the species is not rare in favorable localities. Two were seen September 9, 1903, at Black Lake, 8,400 feet, the highest recorded altitude for the State, others the middle of September, 1901, on ponds along the east side of the Pecos Valley near Carlsbad, several September 17–October 4, 1904, at Lakes La Jara and Burford (Bailey), and one October 12, 1900, at Albuquerque (Stover); four were seen October 7–9, 1913, on a reservoir near Koehler Junction, Colfax County (Kalmbach); [also observed in migration at the V + T Lake and Corduroy Lake, Socorro County, in 1916 (Ligon)].

They remain until late in winter—two were taken November 19, 1908, at Farmington (Birdseye), and one at Dona Ana, November 20, 1855 (Pope). [Noted on the Rio Grande Bird Reserve, November 23–December 9, 1916, and on the Carlsbad Bird Reserve, reported common, December, 1916 (Willett).]—W. W. COOKE.

NEST.—A compactly built floating or anchored raft of tules, reeds, or aquatic plants among tules. *Eggs*: Usually 5 to 7, dull white, more or less nest soiled.

FOOD.—Almost wholly animal matter, nearly half insects, including predatory water bugs, beetles, etc.; about a quarter crawfishes, and nearly a quarter fishes, of slight economic importance. At fish hatcheries the Pied-billed Grebes may do serious damage, when they should be driven away or shot if Federal and State laws permit.¹ But in localities where crawfishes are destructive to crops, the grebes are especially beneficial. They also feed extensively on giant water bugs and predacious water beetles, at times destructive to the small fry of fishes.

GENERAL HABITS.—The thick pied-bill, flat uncrested head, and chunky form of this small Grebe, familiarly called Dab-chick, distinguish it at a glance as it swims around among the tules or cat-tails. It is less often found in clear open water than the other grebes. Like its relatives, if alarmed the Pied-billed will sometimes sink out of sight before your eyes, accomplishing this astonishing feat by compressing or expelling the air from its plumage, lungs and air-sacs; and while you are still watching the spot from which it has vanished, it will swim under water to what it considers a safely distant spot, where it will again rise to the surface; or if still nervous, it may come up among the weeds, as Mr. Eaton says, "with only its nostrils above the water, beside some stick or plant" (1909, pp. 97–98).

At Lake Burford, where Doctor Wetmore found Pied-bills breeding commonly in 1918, their mating displays, while not so varied as those



From Biological Survey

FIG. 4. Pied-billed Grebe
Carrying its downy chicks to
safe harbor

¹ For a summary of Federal, State, and Provincial game laws, see the latest annual Farmers' Bulletin on game laws, U. S. Department of Agriculture.

of the Eared Grebe, were strangely formal and interesting. The most remarkable was a rhythmic, pivoted figure in which the pair, facing each other about a foot apart—the male with feathers of neck and back puffed out and wing tips slightly raised—swung around back to back, and after a second or two swung again face to face; the performance being repeated at ten or fifteen second intervals for nearly ten minutes. Another year at Lake Burford, Mr. Ligon came suddenly upon a nest containing eight of the whitish eggs and three chicks just out of the shell, whereupon one of the nestlings took to water, the other two tumbled about over the eggs, the parent birds staying near, decoyed by flopping and crying out. A mother that Doctor Wetmore surprised with her brood rose threateningly on the water making a great boiling noise by treading water rapidly with her feet. As she swam slowly away, one by one the young climbed on her back until she was carrying four under the feathers of her wings. After the first alarm, when the swimming chick came near its mother, it tried to climb up on her back.

I have seen the startled mother, when discovered with her brood of young in the open, give her cuckoo call—*chuck-uk-uk-uk*—at which the downy brood promptly followed her through tule waterways to thick cover, peeping like little chickens. Their heads and necks, like those of other downy grebes, have the heavy irregular striping that Abbott Thayer the artist and student of protective coloration explained and characterized as “highly specialized oblitative picture-patterns,” for among the tules, where the greatest danger comes from sneaking enemies, the strong irregular markings picture the reeds and their dark shadows.

The commonest Pied-bill note Doctor Wetmore heard was a loud *coh coh coh coh coh cow cow cow cow*, the first series of notes increasing in rapidity as they progressed and the last given more slowly with equal intervals between them. This was varied to *coo-coo-coo-coo-qua*, *coo-coo-qua*, *coo-coo-qua*, continued for some time, the *qua* being prolonged and with a curious rising inflection. A harsh raucous laugh and a low whistled note were also given (1920a, pp. 235-236). Under favorable conditions, Mr. Taverner finds, the loud Pied-bill calls may be heard for a mile or more (1926, p. 39).

When at rest, those that Doctor Wetmore watched “spent much time in preening, and when feathers were loosened in this process (as many were) they were seized, dabbled in the water and swallowed.” This surprising feather-swallowing habit is common to all grebes, and as Dr. Wetmore suggests, plays an important part in their digestion. The grebe stomach, as he explains, has “a small accessory chamber (a pyloric lobe) in which the opening into the small intestine is found. This lobe is almost invariably plugged with a ball of feathers, which act as a

strainer to prevent the passage of fish bones or large fragments of chitin into the intestine until they have been reduced to a proper size and condition by the process of digestion. In this way injury to the intestinal walls from these hard fragments may be avoided" (1924, p. 4).

ADDITIONAL LITERATURE.—ALLEN, A. A., *Bird-Lore*, XVI, 243-253, 1914.—BENT, A. C., *U. S. Nat. Mus. Bull.* 107, 39-47, 1919.—BREWSTER, WILLIAM, *Bull. Mus. Comp. Zool. Harvard*, LXVI, 41-43, 1924.—CHAPMAN, F. M., *Bird Studies with a Camera*, 70, 1900.—CULVER, D. E., *Auk*, XXXI, 395-397, 1914 (concealing postures).—EIFREG, C. W., *Auk*, XXXII, 95, 1915.—GABRIELSON, IRA N., *Wilson Bull.*, XXVI, 13-15, 1914.—ROCKWELL, R. B., *Condor*, XII, 188-193, 1910.—THAYER, G. H., *Concealing-Coloration in the Animal Kingdom*, 83, Figs. 77-82, 1909.—WETMORE, ALEXANDER, *Auk*, XXXVII, 235-237, 1920; *U. S. Dept. Agr. Bull.* 1196, 19-23, 1924.

PELICANS, CORMORANTS, DARTERS, etc.: Order Pelecaniformes

PELICANS: Family Pelecanidae

In the Pelicans the gular pouch is an immense skinny fishing bag or dip-net, hung to the bill, capable of holding several quarts, while the stomach is comparatively small. The air-sacs are extraordinarily developed to lighten the heavy body for flight. The feet are fully webbed. The sexes are alike in plumage, with seasonal variations.

AMERICAN WHITE PELICAN: *Pelecanus erythrorhynchos* Gmelin

DESCRIPTION.—*Length*: About $4\frac{1}{2}$ to nearly 6 feet, extent of wings $8\frac{1}{2}$ to nearly 10 feet; weight about 17 pounds; wing 20-25.2 inches, bill 11-15. *Adults in nuptial plumage*: White, with straw color on breast and wing-coverts and sometimes crest at back of head; *wing-quills largely black*, iris white, grayish or dusky; eyelids red, bare skin about eye, orange; bill and pouch mostly reddish, bill with a horny crest; legs and feet orange-red. *Adults in post-nuptial plumage*: Back of head gray, without crest; bill, legs, and feet yellow, bill without horny crest. *Young in first winter*: White, top of head and wing coverts brownish gray; bill, face, pouch, legs, and feet pale yellowish.



FIG. 5. Pelican

RANGE.—Breeds in the lake regions of the western interior from central British Columbia (one colony), Great Slave Lake, and Lake Winnipeg south to North Dakota, Utah, Nevada, and southern California (one colony near Corpus Christi, Texas); winters from southern California, northern Utah, southwestern Arizona, the Gulf States, Florida, and Cuba south through Antilles and along both coasts of Mexico and Central America to Panama. Wanders in migrations over United States and Canada.

STATE RECORDS.—Formerly the White Pelican was much more common than at present. In the days of its abundance it was common along the eastern foothills of the Rocky Mountains during its migrations between its winter home near the Gulf of Mexico and its breeding grounds in California, Nevada, Utah, and the northern United States and Canada. In 1851 it was found common near Albuquerque (Woodhouse), and a few years later was noted as not uncommon in August at Fort Thorn (Henry). One is reported to have been seen in late years

at Patterson near the valley of the San Francisco River (Bailey). [Near Carlsbad one was seen, July 24, 1925 (Ligon).] On the Carlsbad Bird Reserve, it was noted in the winter of 1911, in the summer of 1913, others on February 18, 1914 (Cooper); and it was seen occasionally in January, 1915; [on the Rio Grande Bird Reserve one was seen November 27, 1916 (Willet)]. A few were seen at Lake Burford in May 1918—two each on May 26 and 27, and four on May 28, possibly on their way north to the Salt Lake Valley (Wetmore)].—W. W. COOKE.

NEST.—In colonies usually on the floor of an island, a depression in a mound of pebbles, or a nest made of grasses, sticks, or reeds. *Eggs*: 2 to 4, white, with a chalky deposit, more or less stained.

FOOD.—Fish, salamanders, tadpoles, and crawfish; and in the interior, also locusts.

GENERAL HABITS.—Such a grotesque, squat figure does the White Pelican present in flight, with his long, pouched bill, enormous flapping wings, and short legs and tail, that he would be remembered always were he the only one seen in a lifetime. But if discovered in a migrating flock, whether acting the part of hydroplane or aeroplane, to one's surprise and amusement over his droll figure will be added admiration and wonder at the concerted masterful evolutions of the flock.

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 121, 282-293 1922.—CHAPMAN, F. M., Camps and Cruises of an Ornithologist, 367-388, 1908.—FINLEY, W. L., Condor, IX, 35-41, 1907.—HALL, E. R., Condor, XXVII, 147-160, 1925 (versus fishes in Yellowstone).—MILLS, LAURA, Condor, XXVII, 32-33, 1925 (fishing).—SKINNER, M. P., Condor, XIX, 178-182, 1917; Roosevelt Wild Life Bull. III, 93-95, 133-146, 1925.—WARD, H. B., Condor, XXVI, 136-140, 1924.

CORMORANTS: Family Phalacrocoracidae

The Cormorants have long slender bills hooked at tip, long sinuous necks, heavy bodies, and legs set so far back that they stand erect. While among the most powerful of swimming birds with short strong legs and fully webbed feet, like the diving ducks, they use their wings when pursuing their prey under water. The adults have no external nostrils but breathe through the mouth, which opens back under the eye. They nest on the ground or rocks on islands, or in trees over water, and the young are hatched naked.



FIG. 6. Cormorant

REFERENCE—TOWNSEND, C. W., Condor, 92-93, 1925 (courtship).

MEXICAN CORMORANT: *Phalacrocorax vígna mexicanus* (Brandt)

DESCRIPTION.—*Length*: 23-28.7 inches, wing 9.9-10.4, bill 1.7-2. *Adults in nuptial plumage*: Lustrous black; head, neck, and belly ornamented with white filamentous feathers. *Adults in post-nuptial plumage*: Brownish black, face partly white, plumes lacking. *Young in juvenal plumage*: Dark brown, paler on throat, fading with wear to nearly white on throat and underparts.

RANGE.—Resident from northwestern Mexico, southeastern Texas, southern Louisiana, Cuba, and Bahamas south to Nicaragua. Has wandered north to New Mexico, Colorado, Kansas, and southern Illinois.

STATE RECORDS.—As its name implies the Mexican Cormorant is a southern species, not coming regularly so far north as New Mexico. A few wander occasionally into the southern part of the State and one was seen, July 25, 1901, near Carlsbad (Bailey). [At Silver City they are of rare occurrence but one was taken on Lyon Dike (Duck Creek), November 12, 1916 (Kellogg).] Several were seen and one taken in April, 1854, at Fort Thorn (Henry). This specimen was originally recorded by Henry as *floridanus* (Proc. Acad. Nat. Sci. Philadelphia, 1855, 317), but when he sent it to Washington, it was identified as *mexicanus*.—W. W. COOKE.

NEST.—Rudely made of sticks and leaves, placed on bushes or trees near or over water. Eggs: 4 or 5, bluish white, with a slight chalky deposit.

GENERAL HABITS.—Suggesting the Water Turkey with its long snaky neck and black body, this occasional visitor is a striking figure, whether perched on the rocks of the shore line or the piles of a pier, and should be carefully looked for in the southern part of the State.

At a seaside resort in southern California I once found a group of Cormorants among the picturesque figures of the pier and one of their number a privileged character of the bathing beach. After pluming his feathers "he would appear to be starting down the slope of the beach and then suddenly open his wings and hold them out as if afraid of falling on his bill, acting so peculiarly that I imagined that he had been wounded. However, when he decided to go, raising both his big paddle feet at once, he proceeded with high awkward hops down the shore. When he finally got to the surf he let it wash him out and in once or twice, looking so helpless that I was sure he must have been wounded. He also rode through the breaking surf, his body down under the foam, his head held high, clear of it. When thoroughly soused he let the waves wash him in again, and came walking laboriously back up the beach, slim and dripping, his bedraggled tail trailing over the sand. Apparently he had been taking a bath! After oiling his feathers he swam out and dived, staying under so long and swimming out so far that he showed his full aquatic power. When he was in the rollers and saw a foaming breaker coming he would bend over, disappearing as the water splashed. When the waves had flattened he would reappear in the smooth water between seas." Another day, apparently the same bird was seen being driven down to water by a cottager, assuming the role of "goose girl" walking slowly behind him with extended arms (1916b, pp. 105-106).

The gentleness and tractibility of the cormorants have been turned to practical uses in China where they are so far domesticated that they fish for their masters—a close collar preventing their swallowing their catch.

ADDITIONAL LITERATURE.—NELSON, E. W., Condor, V, 139-145, 1903.

DARTERS: Family Anhingidae

In the Darters the gular sack is moderate in size.

WATER TURKEY: *Anhinga anhinga* (Linnaeus)

DESCRIPTION.—*Length:* 32.2–36 inches, wing about 14, tail 11, bill 3.2. Bill long, slender, and sharp-pointed; head very small; *neck long and snake-like.* *Adult male:* Glossy greenish black; upperparts marked with silver-gray; back of head and neck plumed in breeding season. *Adult female:* Foreparts brownish, throat and breast buffy. *Young:* Like female, but black replaced by brown and silver-gray markings restricted and bordered with brownish.

RANGE.—Tropical and subtropical regions of North and South America. Breeds from Lower Sonoran Zone of Texas, southern Illinois, North Carolina, and Florida south to Tropical America; winters at least as far north as Arkansas and Alabama; casually to Kansas; accidental in New Mexico and Arizona.

STATE RECORDS.—While the Water Turkey is a tropical species coming north regularly only to the Gulf States, two stragglers that had wandered more than five hundred miles from the nearest breeding place were seen in September, 1854, at Fort Thorn, and the one that was captured was sent to the United States National Museum (Henry).—W. W. COOKE.

GENERAL HABITS.—The reptilian looking Water Turkeys, Black Darters or Snake Birds nest in pairs or in large colonies, Doctor Coues says in his Key, in “the most impenetrable swamps of warm countries,” where they dive and swim under water after fish like the loons and cormorants, or swim “with the body submerged, only the head and neck in sight, looking like some strange kind of water-serpent.”

It is a pleasure to be able to include this unique bird in the State list, though only as an accidental wanderer, and its discovery should stimulate observers to keep a sharp lookout for other interesting passersby. Doctor Grinnell, in a suggestive article on “The Role of the Accidental,” says they may be serving as “sensitive tentacles, by which the species keeps aware of the possibilities of aerial expansion” (1922, pp. 373–380).

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 121, 229–236, 1922.—CHAPMAN, F. M., *Camps and Cruises of an Ornithologist*, 113–122, 1908 (nesting).

HERONS, STORKS, IBISES, etc.: Order Ciconiiformes**HERONS, BITTERNS, etc.: Family Ardeidae**

The Herons and Bitterns have highly developed powder-down tracts “of oily specialized under down” (Forbush); the lower hind neck is often bare and the feathers are long and loose. The bill is sharp pointed and straight or nearly so, the forehead feathered but the lores bare. The head, neck, and body are narrow, wings long, ample, toes long, slender, middle toenail with distinct comb-like edge. In flight the head is usually drawn in and the neck folded close to the breast.

HERONS AND EGRETS: Subfamily Ardeinae

True Herons have highly developed nuptial plumes and some have two color phases—dark and white. Egrets are herons most of which are wholly white. The colors of bill, lores, legs, and feet are variable with age, season, and even individuals.

REFERENCES.—COOKE, W. W., Bull. 45, Biol. Surv., U. S. Dept. Agr., 1913.—PEARSON, T. G., Bull. 5, Nat. Assoc. Audubon Soc., 1924.—WETMORE, ALEXANDER, Condor, XXII, 168-170, 1920 (function of powder downs).

TREGANZA BLUE HERON: *Ardea herodias treganzai* Court

PLATE 4

DESCRIPTION.—Wing 18.5 inches, bill 5.5, tarsus 6.7. *Adults in breeding plumage:* Head mainly white, with black line over eye and black occipital crest with two long filamentous feathers; neck with sides pale brown and median row of black, white, and reddish brown feathers; lower neck with long loose feathers; forepart of back silvery bluish gray, shoulder plumes whitish, long and lanceolate; rump bluish, tail bluish black; bend of wing bright chestnut and white, quills blackish, axillars and wing linings bluish; breast and belly broadly streaked with white; flanks dark bluish slate; thighs deep reddish brown; iris yellow; bill blackish above, yellow below; feet and lower legs slaty, upper brownish or yellowish. *Adults in winter plumage:* Without crest. *Young in juvenal plumage:* Long feathers wanting.

RANGE.—Breeds in Transition and Sonoran Zones of the Western United States except the Pacific coast region from (Washington and Oregon, probably) Montana, Wyoming, and central Colorado south to central-western Texas, southern New Mexico (Chihuahua probably), Arizona, Nevada, Sonora, and northern Lower California; winters in the southwestern United States and Mexico, from Utah, Arizona, New Mexico, and Texas south to west coast of Mexico; north occasionally to Idaho and Wyoming.

STATE RECORDS.—Among the herons, the Treganza Blue is almost the only one that breeds regularly in New Mexico. Its summer range includes favorable localities in much of the State at the lower and middle altitudes, since it is known to nest at Carlsbad, 3,100 feet (Bailey), Fort Thorn, 3,800 feet (Henry), the Gila River, 4,500 feet (Metcalf), Chloride, 6,000 feet (Blinn), Rinconada, 6,000 feet (Surber), and Ribera, 6,000 feet (Bailey). One was shot July 16, 1904, on Red Willow Creek in the Taos Mountains at about 8,000 feet, but it may have nested at a lower altitude. About 25 birds were noted July 20, 1913, at Lake Burford, 7,500 feet, most of them young birds that had been reared in the trees along the lake shore. [In Crane Canyon about 60 miles north of Roswell they have nested for many years, and in 1918 about a dozen old nests were found in two trees. In Buffalo Draw about 15 miles north of Crane Canyon on June 19, 1918, three nests were found containing young ten days old and over; several pairs also nest regularly near the J Ranch on the Gila River, north of Silver City. Two were seen, May 7, 1920, at Gray Ranch, Animas Valley and three, May 9, at the San Simon marshes. A nesting rookery was visited, May 14, 1924, at Red Rock, on the Gila River (Ligon).]

In migration the species ranges much higher, since it was seen August 27, 1908, at Beaver Lake in the Gila National Forest at about 7,500 feet (Birdseye), and was quite common October 6-12, 1908, at the small lakes in the Chuska Mountains among the yellow pines and aspens up to about 9,000 feet (Bailey). It was seen in the northern part of the State near Koehler Junction, one on August 20 and

two on September 4, 1913 (Kalmbach). At Blanco it was found as late as November 19, 1908 (Birdseye). [Between Albuquerque and Socorro in 1917 one was seen August 28, and ten seen September 4 (Ligon).]

At Las Cruces it was noted to November 23, 1909 (Goldman), and it was said to be fairly common in winter near this latter place (Henry), a specimen formerly in the United States National Museum having been taken January 5, 1856, at Dona



MAP 2. TREGANZA BLUE HERON
Triangles mark breeding and breeding season records

Ana (Pope). During the winter of 1912-13, it was rather common at 5,500 feet on the Alamosa River, and at 6,200 feet on the east fork of the Gila (Ligon). On the Carlsbad Reserve it was common January, 1915, [rather common December, 1916. On the Rio Grande Bird Reserve (Elephant Butte), 150 were noted November 23-December 9, 1916 (Willett). On the Rio Grande near Albuquerque it is now very common, wintering (Leopold, 1919)].

The first spring migrants appeared at Las Vegas in 1902 on March 29 (Barber), and 20 were noted on the Rio Grande near Albuquerque, March 21, 1914 (Cooper);



From mounted group in Colorado Museum of Natural History

TREGANZA HERONS

The old birds at their nests, with their newly fledged young, in the tree tops

a migrant was also seen at Chloride April 25, 1915, and two were seen April 26, 1915, at Mayberry Lake, about 60 miles west of Magdalena (Ligon). On the Carlsbad Bird Reserve, 75 were noted April 29, 1914. [At Lake Burford a few spring migrants were seen in 1918, three, on May 29; one, May 30; and one, June 3 (Wetmore).]—W. W. COOKE.

NEST.—Sometimes singly but often in colonies, usually in high cottonwoods or other trees, in swamps, but sometimes among reeds, on rocks, or the ground; wide platforms of sticks, lined sparingly with strips of bark or long grass roots and straws, repaired from year to year. *Eggs*: 3 to 6, dull greenish blue.

FOOD.—Frogs, salamanders, water puppies, lizards, snakes, crabs, crayfish, fish, enemies of food fishes, shellfish, eels, dragon fly nymphs, and other insects, especially grasshoppers and aquatic beetles, together with meadow mice, shrews, ground squirrels, young rats, and gophers. Many harmful rodents are fed to the young.

GENERAL HABITS—At fish hatcheries the herons may do considerable harm, but in natural conditions the fish they eat are of little consequence, and the water snakes of which they are fond are destructive to young trout. In the Chuska Mountains, where the Herons were found in fall, there were no fish in the lakes but frogs and salamanders were abundant. The California form of the Great Blue Heron, or Gopher Crane, as it is called, Doctor Merriam says, is "much prized by the ranchmen because of its habit of catching pocket gophers." When the gopher is pushing dirt out of his runway, a Heron will station himself at the opening, standing motionless with bill poised ready to strike, and when the gopher appears, spear it, toss it in the air, and swallow it head first as it comes down. In irrigated alfalfa fields when the gophers are driven from their burrows by the water, sometimes a dozen Herons will be seen stalking around watching for them. In this way they kill great numbers of the pests and are of peculiar value on the infested ranches.

The fact that a dozen of these great birds may be seen in the alfalfa fields at one time attests their appetite for gophers, for they are solitary hunters, generally being seen alone except at their roosts and in their breeding colonies. On their breeding grounds, the fortunate field student may watch the display of their handsome plumes in their courtship formalities. Other interesting sights have been reported by the enthusiastic photographers, Messrs. Carriger and Pemberton, who saw one youngster, just hatched, trying to eat up his shell. Older ones made frantic efforts to spear their visitors, and so rapid were their spear-like thrusts that most of the photographs taken were a blurred streak (1908, p. 80).

Among the large heronries of the Barr Lake region of Colorado, Mr. Rockwell states that in August, 1906, a hundred Great Blues were killed by a hailstorm.

After the nesting season, these Herons probably wander north like others members of their family. One that was banded by Doctor Wet-

more near Salt Lake, Utah, was killed subsequently near Billings, Montana (1926, p. 91).

The habits of the Treganza Heron along the Rio Grande are described by Professor Merrill, who reports that it "stays along the Rio Grande in the big cottonwoods, going out in the edges of tow-heads and sand flats to feed when there is water in the river. In midsummer the river gets very low and sometimes entirely dry, so these birds go farther from their nesting habitat in the big trees and linger around the shallow lakes and tule marshes. . . . Solitary individuals may thus be seen some distance inland from the river.

"In the more open places they are hard to approach but are less wary when in large trees in more inaccessible places. At Mesquite Lake they feed both in the open water and among the dead willow tangles where their color blends admirably with the blue-gray of the dead willow bark and their forms differ little from the willow stubs.

"They feed on small fish and the stock of mud-cats diminishes rapidly in this shallow lake when summer reduces its waters to a minimum. Their appetites appear terribly hard to satisfy, judging by the time they put in fishing, for they stay on the grounds nearly all day if unmolested.

"Their numbers are greater during migration, though they are never numerous." And he adds, "I think some winter here as I have seen them in the Rio Grande in the middle of December, usually about our coldest season" (MS).

On their migratory flights, when passing over large bodies of water, singularly enough these great long-legged waders sometimes drop down to rest on the surface of deep water, in one recorded instance on water at least two hundred feet deep (Grasett, 1926, p. 367). This would seem to necessitate oil glands for feather dressing, which they lack. The use of the powder-down patches, which they have, has long been in dispute, a favorite theory being that they were phosphorescent and of use in fishing at night. But by watching young developing birds, Doctor Wetmore has finally settled the question, proving that the greasy powder takes the place of oil from the oil glands of other birds, used in dressing the feathers.

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus., Bull. 135, 123-127, 1926.—CARRIGER, H. W., and J. R. PEMBERTON, Condor, X, 78-81, 1908.—COURT, E. J., Auk, XXV, 291-296, 1908.—FINLEY, W. L., American Birds, 221-231, 1907.—FORBUSH, E. H., Birds of Massachusetts, I, 324-328, 1925.—WETMORE, ALEXANDER, Condor, XXII, 168-172, 1920 (powder-down patches).

SNOWY HERON; SNOWY EGRET: *Egretta thula thula* (Molina)

PLATE 5

DESCRIPTION.—Length: 20-27.2 inches, wing 8.2-10.5, bill 2.1-3.6, tarsus 3.1-4.5. Plumage wholly white. Adults in breeding plumage: Back of head with crest of

"loose-webbed, up-curved feathers;" *shoulders with "stiff-shafted up-curved plumes"* (Forbush) *reaching beyond tail*; iris and bare skin of lores yellow, bill black, yellow at base, *legs black, feet yellow or orange*. *Adult winter, and young plumage*: Without shoulder plumes.

RANGE.—Temperate and tropical America. Formerly bred from Oregon (recorded from Alberta), Nebraska, Indiana, and New Jersey to southern South America; now breeds locally in the United States, small colonies being in California and Utah, but the main present breeding range is Porto Rico and near the Atlantic coast from North Carolina to Louisiana and Texas, south to Chile and Argentina. Resident throughout most of its range in South and Central America and in the southern and western United States; casual or accidental north to Alberta and Nova Scotia.

STATE RECORDS.—Among all the herons and probably among all the birds of North America, the Snowy Heron or Egret is the only species of which adult birds migrate north in the spring far beyond the northern limit of their breeding range and remain there as non-breeders throughout the entire summer. Such birds were noted at Fort Thorn in 1853-1855 (Henry), and one was shot in April, 1910, on the Gila River near the mouth of Black Canyon (Bergtold). More commonly the young-of-the-year migrate north in the fall and are present for several weeks before departing for their winter home in the subtropics. One of these migrants was shot in the Playa Valley September 24, 1886 (Anthony); another high up in the foothills of the Mimbres Mountains on Sappello Creek October 21, 1908 (Bergtold, 1909, p. 76); and a third as late as November 5, 1906, at the Canaigre irrigating lake 20 miles north of Deming at 4,400 feet (Munson, 1907, p. 212). This last was recorded as *Ardea egretta*, but the specimen was sent to the Biological Survey for examination and proved to be the present species. One specimen shot at Mesilla in October, 1910, is now in the College Museum (Ford), and two birds stayed in the neighborhood the whole summer of 1913 (Merrill). On the Carlsbad Bird Reserve it was reported as seen twice in ten years (Willett, 1915). The breeding colonies of the Snowy Egret nearest to New Mexico are at Great Salt Lake, Utah, and at the mouth of the Rio Grande, Texas. [At the crossing of the Brazos River below Park View one was seen May 23, 1918, and another that evening at Lake Burford; two at the lake on May 26, and another, June 5, all presumably on their way to the Utah colony, the only interior breeding colony in the region (Wetmore).]—W. W. COOKE.

NEST.—In colonies, a platform of sticks in bushes or low trees over water. *Eggs*: Usually 4 or 5, pale bluish green.

FOOD.—Frogs, snakes, lizards, small fish, crawfish, salamanders, crabs, shrimps, snails, aquatic insects, and cut-worms.

GENERAL HABITS.—The remarkably developed nuptial plumes of the Snowy Heron or Egret can not fail to rouse our admiration, and it is with peculiar interest that we read of Mr. Forbush's suggestive and rare experience in a Florida swamp where a dozen of the beautiful birds were using them in courtship evolutions. As he says, "They strutted about, raised, spread and lowered their lace-like plumes, pursued one another back and forth, bowed and turned about . . . displaying all their airs and graces . . . so engrossed . . . that they never noticed me until one incautious movement on my part put them all to flight" (1925, p. 332).

The local names, Little Egret, Lesser Egret, Little Snowy, and Bonnet Martyr, give a clue to the sad history of this hunted bird. Its delicate plumes, recurved at the tip, are the "cross aigrettes" of the millinery trade, whose sale, after a long, arduous campaign, has been prohibited by law.

While the persecuted Snowys are now rarely seen, the protection afforded them in recent years by the game wardens of the Audubon Society has enabled them to increase in numbers in a few localities. A protected rookery on an artificial pond close to a gentleman's residence in Louisiana offers a good illustration of the legitimate pleasure to be had from these beautiful birds—heretofore slaughtered at their nests for the decoration of hats. On this protected nesting ground the Egrets are so unafraid that one of the greatest pleasures of their host and his human guests is to watch them during the spring evenings as their snow-white forms appear one after another, on their return home to roost, or to relieve their mates on guard at the nests. A gratifying and thrilling sight it is, indeed, and one full of pathos when we remember the work of the plume hunters whose role has been to lie in wait for the faithful parents at the rookeries and, shooting them down, leave the young to starve in their nests.

In New Mexico one of the Snowy Egrets appeared at the G. O. S. ranch, October 21, 1908, and was watched for several hours "flying about the barn buildings in company with a flock of domestic pigeons," after which it lit on a pond where it was shot in cold blood by one of the farm hands.

It is especially interesting to hear that two of the rare birds once spent a summer not far from the Agricultural College of New Mexico in a tule-filled sink bordered by cottonwoods and tornillos, and it is to be hoped that if they ever repeat this experiment they will be safeguarded in a manner befitting the neighborhood of an institution of sound valuations. It is also gratifying to learn that in Argentina the Snowy Heron is on the list of birds protected by a decree of the President.

ADDITIONAL LITERATURE.—ANTWONET, E., and A. O. TREGANZA, *Condor*, XVI, 245-250, 1914.—BENT, A. C., *U. S. Nat. Mus. Bull.* 135, 146-156, 1926.—PEARSON, T. G., *Educational Leaflet* 54, *Nat. Assoc. Audubon Soc.*; *Bull.* 5, *Nat. Assoc. Audubon Soc.*, 1924 (*Herons of U. S.*).

GREEN HERON: *Butorides virescens virescens* (Linnaeus)

DESCRIPTION.—*Length:* 15.5-22.5 inches, wing 6.3-8, bill 2-2.5, tarsus 1.7-2.1. Crown and back with lanceolate plumes, back of neck bare, covered by long feathers of sides of neck. *Adults:* Top of head and long soft crest, dark glossy green; back with long gray plumes glossed with green; wings and tail dark glossy green, wing coverts marked with lighter; sides of head and neck mainly rich maroon; throat with narrow medium line whitish, streaked with brown; rest of underparts brownish gray; iris orange or yellow; bill mainly greenish black; legs and feet



From National Association of Audubon Societies

SNOWY EGRETS

The "Bonnet Martyrs," the sale of whose beautiful plumes has, at last, been prohibited by law

greenish yellow. *Young in juvenal plumage:* Head less crested, back without plumes; underparts streaked with brown.

RANGE.—Breeds from South Dakota and southeastern Canada south to Mexico, Central America, and extreme northern South America; winters principally in Mexico and Central America but also in southeastern States—South Carolina, Florida, Texas; accidental in Colorado(?), New Mexico, Texas, and Porto Rico.

STATE RECORDS.—The regular breeding range of the typical form of the Green Heron extends west to western Texas and Kansas and the bird is known in the Rocky Mountain region only as an accidental visitant. One was seen in the spring of 1904, at Rinconada (Surber). This was undoubtedly the eastern bird *virescens*, but there is no certainty that this is the form occurring at Mesilla for a western subspecies *anthonyi* is a regular though not common breeder in eastern and southeastern Arizona almost to the New Mexico line and undoubtedly sometimes enters the latter State. Some form of the Green Heron breeds not rarely at Mesilla and may possibly, though not probably, winter there since it has been seen as late as December and as early as February (Merrill). It was many years ago recorded as occurring at Fort Thorn (Henry).—W. W. COOKE.

NEST.—Singly, or in small colonies; when possible, on bushes or trees, usually near water, loosely made of sticks. *Eggs:* Ordinarily 4 or 5, pale greenish.

FOOD.—Frogs, minnows, salamanders, lizards, crabs, crawfish, leeches, snails, snakes; also worms, spiders, dragon flies, insect enemies of fish, grasshoppers, locusts, and others.

GENERAL HABITS.—This little Green Heron or "Fly-up-the-Creek," is found along small wooded streams and ponds, in swamps and beside woodland lakes, but as it rests quietly during the day, feeding mainly in the early morning or at nightfall it is usually seen only when flushed. Then, as Doctor Chapman says, it "springs into the air with a frightened *skeow* or explosive whistle, and, alighting at a safe distance on a tree or some elevated perch, with upstretched neck watches the intruder, betraying its apprehension by nervous twitchings of the tail" (1912, p. 227). Meanwhile the pleased intruder in his turn gazes with keen satisfaction upon the green-crested head and handsome maroon neck of the woodland hermit.

While the small green herons nest, near Mesilla, along the Rio Grande where the Great Blue Herons do, they nest preferably, as Professor Merrill found, in small cottonwoods in wet places where they get food. When nesting they are well hidden by the foliage of the trees, but when feeding in the tall rushes their presence is often betrayed by a "throaty grunt of satisfaction" (MS).

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 135, 185-194, 1926.—PEARSON, T. G., Educational Leaflet 66, Nat. Assoc. Audubon Soc.

BLACK-CROWNED NIGHT HERON: *Nycticorax nycticorax naevius* (Boddaert)

PLATE 6

DESCRIPTION.—*Length:* About 23-26 inches, wing 11-12.8, bill 2.8-3.1, tarsus 3.1-3.4. Bill and legs comparatively short and stout. Back of crown in nuptial plumage with white cord-like plumes. *Adults:* Crown and back black with

bluish or greenish gloss, in sharp contrast to white of forehead, neck, and underparts and ash gray of wings and short tail; iris red, skin of naked lores greenish, bill black, legs and feet yellowish. *Young, in first year:* Upperparts cinnamon brown, wings with *tear-shaped and round white marks*; throat white, rest of underparts (except lower belly, etc.) *heavily striped with brown and white*; iris yellow or dull orange.

COMPARISONS.—The striped young Black-crowned Night Heron must not be confused with the Bittern (see p. 96). It is never yellowish, the back is coarsely marked, and the wing quills are never black. It often alights and nests in trees or bushes, which the Bittern never does.

RANGE.—From southern Canada to Central and South America. Breeds from southern Saskatchewan, Oregon, Wyoming, Manitoba, Ontario, Quebec, and New Brunswick south to the Falkland Islands, Chile, and the Hawaiian Islands. Resident in Central and South America. In North America winters from Oregon, Utah (rarely), and Massachusetts south along Atlantic and Gulf States and in California.

STATE RECORDS.—Few species of birds have a wider distribution in the world than the Black-crowned Night Heron; in the Western Hemisphere it breeds from Canada to Patagonia [southern Argentina], but New Mexico has comparatively few localities adapted to its needs and it is rather rare in the State; it is, however, probably more common there than its few New Mexico records would indicate. One young bird was seen September 24, 1913, on Red River near Dorsey (Kalmbach); it was noted through the summer and undoubtedly nested on the Rio Grande near Fort Thorn (Henry), and is a common breeder at Mesilla (Merrill). A small colony nested in 1901 near Carlsbad and young just able to fly were found there July 25 (Bailey); at Lake Burford, 7,500 feet, a small colony of 25-30 birds with full-grown young was noted July 30, 1913. [In the last of July, 1916, they were nesting abundantly and young unable to fly were found (Ligon); while in May-June, 1918, 15 pairs were preparing to breed (Wetmore). At Silver City they are fairly abundant in spring and probably breed (Kellogg, 1927).]

In fall they were noted on the Mimbres in 1912 (Rockhill); several were seen near Gila, October 6-12, 1908 (Goldman), and three at Bernalillo October 29, 1900 (Birtwell); on the Carlsbad Bird Reserve a specimen was taken in October, 1908, and three others were seen by M. A. Ohnemus in November. [In Albuquerque a flock wintered in 1917 and 1918 (Leopold).]

In the spring the species was noted March 8, 1903, at Mesilla (Ford), and April 14, 1901, at Albuquerque (Birtwell).—W. W. COOKE.

NEST.—In colonies, platforms of sticks placed on bushes or tree tops; or of reeds or rushes laid on the ground among reeds. *Eggs:* Usually 3 to 5, pale bluish green.

FOOD.—Frogs, toads, tadpoles, lizards, salamanders, leeches, fish, water-dogs, crawfish, crabs, dragon fly nymphs, wasps, crickets, grasshoppers, weevils, Colorado beetles, and other insects; also mice, and sometimes aquatic plants, fed to the young.

GENERAL HABITS.—As we rode our horses up the irrigation ditch to the Carlsbad dam on July 25, 1901, from an island-like mass of cat-tails edged with rushes, thirteen of the gray-winged Black-crowned Night Herons rose unwillingly, a striped young one just able to take wing straggling heavily behind. With necks crooked in and wings flapping quickly, they flew ahead of us for a few rods; then turned and with flattering confidence flew back down the ditch facing us with black crowns and black backs in evidence, settling back in the cat-tails to



From Handbook of Birds of the Western United States

BLACK-CROWNED NIGHT HERON

His long white nuptial plumes show well on his dark back

complete their day's rest. For, as their name indicates, most of their feeding is done at night, though in the nesting season, Doctor Chapman says, "the demands of the young force them to feed both day and night." At this time, when catfish and small carp are speared by them, Dr. T. S. Roberts notes, they are swallowed whole, head first, and afterwards regurgitated from the gullet for the young. The nesting colonies sometimes contain thousands of pairs, but the birds usually hunt alone and a solitary one may often be seen flying high across the sky, occasionally uttering the loud *quawk* that has become its familiar name in the country side.

At Lake Burford, Doctor Wetmore flushed Night Herons from the rushes along the lake shore and occasionally saw five or six together, enjoying the sun on open beaches. In the evening they flew back and forth in front of his cabin to convenient points from which to watch for the water dogs that, with frogs, seemed the only available food supply. On one occasion, when he was sitting in a blind in the rushes, a Heron flew by, and spying a dead water dog floating in the lake alighted on the water *where it was six feet deep* and seized the axolotl in its bill. It rested on the surface for a moment and then rose easily and flew off with its prey. In fact, Doctor Wetmore found the birds playing the part of active scavengers and keeping the dead water dogs well cleaned up.

At Mesilla Park, Professor Merrill found the Night Herons the most common of their family. They bred in the big trees along the river and foraged inland to shallow lakes and marshes as food gave out on the Rio Grande. Although they like to sit humped up in flocks among dead trees as if asleep, Professor Merrill says that a watch is evidently kept, for unless a very cautious approach is made a squawk from one starts up the whole flock, and they all disappear into the leafy trees.

In Albuquerque, Mr. Aldo Leopold reports, a colony of Night Herons protected by the Game Protective Association have not only safely raised their young but spent the winter *within city limits*, spending their days in the cottonwood trees and at sunset flying down to their hunting grounds on the river, so giving the people of the city a rare opportunity to become familiar with a most interesting phase of bird life.

ADDITIONAL LITERATURE.—BAILEY, S. W., Auk, XXXII, 424-441, 1915.—BENT, A. C., U. S. Nat. Mus. Bull. 135, 197-213, 1926.—CAREY, H. R., Bird-Lore, XXVII, 1-7, 1925.—CHAPMAN, F. M., Bird Studies with a Camera, 76-85, 1900.—FINLEY, W. L., American Birds, 225-231, 1907.—GROSS, A. O., Auk, XL, 1-30, 191-214, 1923 (life history); XLII, 99, 1925 (changing color of eye).—ROCKWELL, R. B., Condor, XII, 113-121, 1910.

BITTERNS: Subfamily Botaurinae

Bitterns are herons of rather inconspicuous colors; mostly without long nuptial crests or plumes. They commonly nest separately instead of in colonies.

AMERICAN BITTERN: *Botaúrus lentiginósus* (Montagu)

PLATE 7

DESCRIPTION.—*Length*: 24-34 inches, wing 9.8-12, tail 3-4, bill 2.5-3.2, tarsus 3.1-3.8. Feathers of back of head and neck, long, lax and coarse; *sides of breast with concealed white or buffy nuptial plumes in breeding male*, ordinarily absent in female. *Adults*: Upperparts brown, streaked and mottled with buffy in a fine and intricate vermiculated design; *wing tips black*; throat white, side of neck with wide black velvety streak, sometimes absent; *underparts yellowish, coarsely striped with white*; iris yellow, bill and legs mostly yellowish green, or greenish yellow. *Young in juvenal plumage*: Like adult, but without black patch on side of neck, plumage softer, more buffy.

COMPARISONS.—The Bittern when near by, with its size and buffy or yellowish underparts and intricate back pattern, stands alone, but the young Black-crowned Night Heron suggests it (see pp. 93-94). At a distance, in flight, the Bittern's outline, head drawn in and legs outstretched, suggests the herons, but difference in size, its slow wing beat, and its habit of lighting on the ground distinguish it.

RANGE.—Most of North and Middle America. Breeds from British Columbia, central Mackenzie, Hudson Bay region, and Newfoundland south to Florida (less frequently in southern states), Kansas, southern Colorado, New Mexico (probably), northern Arizona, and southern California; winters principally on the Pacific coast (a few in southwestern British Columbia), and in southern States but also in Mexico and Central America south to Panama; casually to Jamaica, Bermuda, and Europe.

STATE RECORDS.—The American Bittern undoubtedly breeds in northern New Mexico, for eggs have been taken near Alamosa, Colorado, close to the New Mexico line and there are many places with similar natural conditions in the northern part of the State. As yet no nests have been reported, but one of the birds was seen June 7, 1898, near Las Vegas (Mitchell); along the Rio Grande near Fort Thorn, a few were seen each summer from 1853 to 1855 (Henry); and they were reported in 1908, as being common in summer at San Rafael (Bailey) and at Mangus Springs (Metcalf). [At Lake Burford two were found May 29 and June 11, 1918, and as both were pumping, the birds may breed there (Wetmore). At the Rio Grande Gun Club lakes one was seen and others heard pumping in the tall grass, June 16, 1919, presumably nesting; about 15 were noted, May 9, 1920, in the willows at the San Simon marshes (Ligon).]

In the fall migration [one was taken at Silver City, September 26, 1922 (Kellogg)]; some were noted near Santa Rosa the first week in October, 1902 (Gaut), one near Albuquerque October 9, 1901 (Birtwell), and a late migrant at San Rafael, October 30, 1908 (Bailey).

A spring migrant appeared at Albuquerque, April 20, 1901 (Birtwell).—W. W. COOKE.

NEST.—Usually in marshes but also in brush-grown meadows, on the ground, or over water, a platform made of sticks, stems of grass, weeds, or rushes. *Eggs*: 4 to 7, brownish drab.

FOOD.—Frogs, lizards, small snakes, crawfish, mollusks, and small marsh animals, as meadow mice, shrews, and small birds, rarely small fish; also insects, as dragon flies, grasshoppers, locusts, and water beetles.

GENERAL HABITS.—The American Bittern is a remarkable product of evolution, combining protective or "obliterative coloration" made effective by protective attitudes, with the use of startlingly conspicuous



Photograph by S. S. Stansell

AN OLD MOTHER BITTERN AND HER BRISTLING BROOD

nuptial plumes and blatant vocal performances. When, in a tule marsh, on taking alarm he strikes his favorite attitude, pointing his long bill skyward, the light stripes of his head and neck, as Abbott Thayer says, imitate the bright reed stems, while the dark stripes picture the "reeds in shadow or the shadowed interstices between stems." So great is his evident trust in his statuesque pose that he has been known to hold it for something like an hour in a tree on the Boston Common, in plain sight of all passersby. In one recorded case he apparently felt himself so well camouflaged that he actually feigned death, allowing himself to be picked up. His resources seem endless. When a breeze sets the cat-tail flags around him "rustling and nodding," Mr. Barrows says he sways gently from side to side in unison with them, when the breeze subsides becoming rigid again (1913, p. 189).

But while thus perfectly adapted to his environment and safeguarded in his own person by voluntary poses and movements and by a dress the plainness of which verges on the homely, the attention of his prospective mate is presumably held and the perpetuation of the species assured by the development of beautiful snowy nuptial plumes, shaken from their brown concealment in dazzling display during the strange rivalries of courtship. Here again attitude and plumage work together, for, as Mr. Brewster discovered, the ordinary erect position is exchanged for a low crouching attitude that makes the birds resemble pheasants or grouse more than herons, and throws the white wing-like nuptial tufts into conspicuous relief.

As if this remarkable coordinated development of plumage and attitude were still inadequate to her purposes, nature has worked out a strange vocal specialization, the skin of the Bittern's neck becoming "much thickened and of a gelatinous texture, as in the necks of the various grouse that boom, so that it serves as an elastic bellows," producing sounds that variously represent stake driving and the working of a creaking wooden pump, from which the bird is known locally as Stake Driver or Thunder Pumper.

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 135, 72-84, 1926.—BREWSTER, WILLIAM, Auk, XXVIII, 90-100, 1911 (display of plumes).—CHAPIN, J. P., Auk, XXXIX, 196-202, 1922 (booming).—FARGO, W. G., Auk, XLV, 203-204, 1928 (courtship).—FORBUSH, E. H., Birds of Massachusetts, I, 315-321, 1925.—PEARSON, T. G., Educational Leaflet 130, Nat. Assoc. Audubon Soc.—ROCKWELL, R. B., Condor, XIV, 117-119, 1912.—THAYER, G. H., Concealing-Coloration in the Animal Kingdom, 56-57, 1909.—TORREY, BRADFORD, Auk, VI, 1889, 1-8; Everyday Birds, 69-81, 1901 (booming).

LEAST BITTERN: *Ixobrychus exilis* (Gmelin)

Description.—*Length*: 12-14.2 inches, wing 4.3-5.2, bill 1.6-1.9, tarsus 1.5-1.7. *Adult male*: Crown, back and tail glossy greenish black; back of neck and patch on wing, brown; throat white, underparts buffy, with dark brown patch each

side of breast; bill largely pale yellow; lores and bare skin about eyes greenish, iris and toes yellow, legs green or yellowish. *Adult female:* Back mainly brown, with two light stripes; underparts striped. *Young in juvenal plumage:* Like adult female, but feathers of back and shoulders tipped with buff.

RANGE.—Breeds in southern Canada, the United States and Central America, from Oregon, North Dakota, southern Ontario, and New Brunswick south to Guatemala, Mexico and Lower California; winters from Arizona, Florida, islands of the Caribbean Sea and Central and South America south to Patagonia.

STATE RECORDS.—The summer home of the Least Bittern includes the northern half of the eastern United States west to Kansas and Nebraska and also the contiguous parts of southern Canada. It also breeds in the Gulf States west to the mouth of the Rio Grande, in Mexico, and rarely in California and Oregon. Thus its breeding range surrounds New Mexico, but the species is almost entirely absent as a breeder from the whole Rocky Mountain region and is very rare there as a migrant or wanderer. The first record for New Mexico is that of a specimen sent to Washington by Doctor Henry, who says that he saw four or five in the summer of 1854 near Fort Thorn. [At the Rio Grande Gun Club Lake, one was seen June 16, 1919, and several years previous one was seen at Palomas Hot Springs on the Rio Grande (Ligon). At Silver City one was taken, September 30, 1926 (Kellogg).]—W. W. COOKE.

NEST.—In fresh-water swamps and marshes, in reeds, cat-tails, or low bushes, usually over water, a platform of reeds or twigs. *Eggs:* 3 to 6, bluish or greenish white.

FOOD.—Frogs, tadpoles, water lizards, minnows, crawfish, snails, slugs, leeches, worms, grasshoppers, dragon flies, beetles, marsh insects, water scorpions, and occasionally shrews and field mice.

GENERAL HABITS.—The Least Bittern with its disguising brown and green plumage might easily be overlooked because of its small size, shyness, and secretive habits. While it is sometimes seen flying low over the marshes, it usually hides in the long grass or reeds, climbing from stalk to stalk as it gets its food of insects and small aquatic animals.

ADDITIONAL LITERATURE.—ALLEN, A. A., *Bird-Lore*, XVII, 425-430, 1915.—BENT, A. C., *U. S. Nat. Mus. Bull.* 135, 84-93, 1926.—CHAPMAN, F. M., *Bird Studies with a Camera*, 62-75, 1900 (nesting).—PEARSON, T. G., *Educational Leaflet* 98, *Nat. Assoc. Audubon Soc.*—WILLETT, G., and A. JAY, *Condor*, XIII, 157, 159, 1911.

STORKS AND WOOD IBISES: Family Ciconiidae

Storks and Wood Ibises have very stout bills, the upper mandible not grooved. The plumage is without powder-down tracts.

WOOD IBISES: Subfamily Mycteriinae

WOOD IBIS: *Mycteria americana* Linnaeus

DESCRIPTION.—*Length:* 35-45 inches, wing 17.6-19.5, bill 6.1-7.3, tarsus 7-8.5. *Basal half of bill straight, tip decurved;* whole head and back of neck bare (less in female, mostly feathered in young). *Adults:* Plumage mainly white, but bald head livid bluish and yellowish; wing quills and tail black, with metallic reflections; iris dark brown or dark red, legs blue, toes blackish, webs yellowish. *Young in first*

winter: Face naked, rest of head and neck thinly covered with coarse hairlike feathers of grayish brown; body dull white.

RANGE.—Breeds in southeastern United States, Central and South America south to Patagonia. After the breeding season it moves north to southern California, Arizona, Texas, New Mexico, southern Illinois, and southeastern Indiana (casual stragglers have wandered north to Wyoming, Montana, and eastward to New Brunswick); winters occasionally as far north as Florida and South Carolina.

STATE RECORDS.—The only record of the Wood Ibis in New Mexico is that of Henry, who wrote: "A few seen along the Rio Grande during the months of September and October. More common on the sloughs near El Paso del Norte, where I saw a moderately large flock in August '54" (1855, p. 316). Those seen in New Mexico were near Fort Thorn. The Wood Ibis is a tropical species, and the colonies breeding nearest to New Mexico are probably those at the mouth of the Rio Grande. As this species, in common with many of the herons, has the habit of northward migration in the fall, these wanderers, principally young-of-the-year, are the ones that would be noted in New Mexico.—W. W. COOKE.

GENERAL HABITS.—The heavy bill, which proves this unusual bird a stork, makes the name of Wood Ibis, by which it is commonly known, an unfortunate misnomer. The adaptation of its long peculiar bill to its feeding habits, as shown in Baird, Brewer, and Ridgway, is striking. When wading for food it holds the decurved tip open two or three inches in contact with the mud. "In this position it walks slowly about, raking the bottom with first one foot, then the other, as each is moved forward to make a step, and just before its weight is thrown upon it. Many of the animals on which the bird feeds are startled from their coverts by this raking, and in their fright take shelter within the open bill of their enemy." Besides crawfish, crabs, frogs, turtles, minnows, and snakes, it is said to eat young alligators, which require a strong bill to hold them. While on the ground it conceals its white plumage among the reeds but in the open is conspicuous enough, perching on the tops of tall trees and sometimes, gathering in large flocks, circling high in the sky like the Turkey Vulture.

In Uruguay, Doctor Wetmore found the Wood Ibis ranging in bands of from ten to twenty, "often accompanied by a Roseate Spoonbill or two" (1926b, p. 61).

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 135, 57-64, 1926.

IBISES: Family Threskiornithidae

Subfamily Threskiornithinae

The Ibises have long, almost cylindrical bills, blunt at tip, grooved and curved throughout; space in front of the eye, bare; legs short for the order, front toes webbed at base. The sexes are alike, the young and adults different. They inhabit marshes, swampy rivers, and lake shores in warm countries, feeding on crustaceans, frogs, etc.

[SCARLET IBIS: *Guáira rúbra* (Linnaeus)¹

DESCRIPTION.—*Length:* About 28-30 inches, wing 10.8-11, bill 6-6.5, tarsus 3.7-3.8. Long bill decurved. *Adults:* Face bare, pale red; body scarlet; tips of outer quills black.

RANGE.—Northern and eastern South America, from Venezuela to eastern Brazil; north accidentally to the United States.

STATE RECORDS.—Doctor Coues says that in June, 1864, he examined a fragment of a specimen that had been taken on the Rio Grande near Los Pinos. This is a strange place for the bird to be found since it is a neotropical South American species that occurs only casually in the West Indies and perhaps Central America. "Its claim to a place on our check list rests for the most part on questionable evidence" (Bent, 1926, p. 34).¹

WHITE-FACED GLOSSY IBIS: *Plégadis guaraúna* (Linnaeus)

DESCRIPTION.—*Length:* About 19-26 inches, wing 9.3-10.8, bill 3.7-6, tarsus 3-4.4. *Bill long, decurved.* *Adults:* Face whitish, naked skin between eye and bill red; head, neck, and underparts mainly rich chestnut; crown, lower back, wings, and tail iridescent purple and bronze green; iris red, bill blackish, reddening toward end; legs and feet dusky-reddish. *Adults in winter:* Head and neck streaked with brown and white. *Young in juvenal plumage:* Head, neck, and underparts grayish brown; upperparts rich metallic green. A partial September molt makes head and neck streaked like winter adult.



From Handbook of Western Birds

FIG. 7. White-faced Glossy Ibis

RANGE.—Temperate and Tropical America, from Oregon (casual to southern British Columbia, Washington, and Minnesota), Nevada, Utah, Texas, and Florida south to Mexico and southern South America, south of the Amazon Valley. Range discontinuous; practically unknown from Central America (south of Mexico) and northern South America.

STATE RECORDS.—Breeding in Mexico and north to Texas, Utah, and Minnesota, yet the White-faced Glossy Ibis is known only as a migrant in New Mexico. At low altitudes it has been noted at Fort Thorn, August, 1854 (Henry); Apache, September 7, 1886 (Anthony); Mesilla, September 24, 1913 (Merrill); Ojo del Cuerpo, September 29, 1855 (Pope); and several small flocks in the bottom of the Gila Valley near Redrock, October 3, 1908 (Goldman). During the spring migration two were seen at Fort Fillmore in May (Henry), one at Palomas the spring of 1909 (Goldman), and several near Las Vegas in 1898 (Mitchell). This last record is at the highest altitude, about 6,000 feet, while the others are below 5,000 feet. Specimens have been shot in Colfax County by Mr. Charles Springer. Two mounted birds were seen at Glenwood, shot by Mr. Kitt in the fall migration a year or so before on the San Francisco River a few miles below Glenwood (Bailey, 1906). On the Carlsbad Bird Reserve, 13 were seen and one taken in the spring of 1912 (Willett). [On May 18, 1919, a flock of 12 were seen 30 miles southeast of Silver City on an irrigation pond of the Rio Mimbres, and on May 23, 1922, a flock of 14 was seen at the same locality (Kellogg).]—W. W. COOKE.

¹ In accordance with the usual custom, certain species of doubtful occurrence in the State are included within brackets.

NEST.—In colonies, sometimes in low bushes but generally in tule marshes, on bent-over tules, made of tule stalks and lined with marsh grass. *Eggs*: Usually 3 or 4, dark blue, fading to lighter blue during incubation.

FOOD.—Largely insects, worms, snails, and other mollusks, crustaceans, especially crawfish; small fish, and occasionally frogs.

GENERAL HABITS.—The White-faced Glossy Ibis, one of the most picturesque and individual birds that enters the United States, is to be looked for in New Mexico as a rare possibility during the migrations. Our only meeting with him in the State was a most unexpected one. On descending from the snowy Mogollon Mountains, in November, 1906, we made camp at Glenwood, a stage station at about 5,000 feet in the San Francisco River Valley, and near by, on the freight road, perched on a dooryard fence, to our astonishment we discovered two stuffed Glossy Ibises. Inside the house we also found a mounted Blue Heron. When the Ibises had been shot and brought in, the apologetic taxidermist said, they were so handsome that she wanted to save them, and having nothing better had put them up with tobacco and camphor gum, making eyes with black buttons and yellow satin!

In life, the foreign looking birds make unusual pictures. A flock of about thirty that we once found near an alkaline lake in southern California were "standing around taking their comfort, or walking about humped over like curlew, probing with their long decurved bills, and at a distance they looked black enough to justify their common local name Black Curlew, for we were not near enough to see the iridescence that gives them the name, Bronze Curlew. As we approached they rose, with a loud *quank, quank*, and circled about in a close flock looking as decorative as figures on a Japanese screen, each bird a segment of a circle with its long extended drooping neck and legs. As they swung around and the sun struck them, their long necks glowed dark maroon and their backs shone dark green. It was a picture for an artist. After circling low around us they dropped down in the place from which they had arisen, after which they stalked about unconcernedly, probing the ground. They must also have been feeding along the lake shore for in places the whitish crust of dried algae was as riddled as a long used target (1917b, p. 157)."

At Los Banos, California, where Doctor Chapman and Mr. Fuertes found the Ibises so shy that it was difficult to get near enough to hear their nasal *ooh-ick-ooh-ick* as they took wing, the bird men, nevertheless, had a most remarkable experience with these strange birds. "On several occasions," Doctor Chapman says, "we were privileged to see flocks of from ten to forty of these usually dignified birds perform a surprising evolution. In close formation, they soared skyward in a broad spiral, mounting higher and higher until, in their leisurely and graceful manner, they had reached an elevation of at least five hundred feet. Then,

without a moment's pause, and with thrilling speed, they dived earthward. Sometimes they went together as one bird, at others each bird steered its own course, when the air seemed full of plunging, darting, crazy Ibises. When about fifty feet from the ground, their reckless dash was checked and, on bowed wings, they turned abruptly and shot upward. Shortly after, like the rush of a gust of wind, we heard the humming sound caused by the swift passage through the air of their stiffened pinions" (1908a, p. 292).

In South America near Buenos Aires, on November 16, 1920, it is gratifying to learn, Doctor Wetmore found nearly a thousand of the Ibises scattered through the flooded fields.

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 135, 52-57, 1926.—WILLETT, GEORGE, and ANTONIN JAY, Condor, XIII, 158 and 159, 1911 (nest).

DUCKS, etc.: Order Anseriformes

DUCKS, GEESE, and SWANS: Family Anatidae

The large bills of the waterfowl are peculiarly adapted to their feeding habits, having flutings or teeth-like projections along the edges of both mandibles, which enable them to strain out their food from the water. Their feet are palmate or webbed in front, and their legs placed far to the sides of their broad bodies, making them waddling walkers but free swimmers. Their plumage is soft and dense with a copious under covering of down. The nest is on the ground, or in hollow stumps or trees, and the young, which hatch covered with down, follow the mother at once. The family is one of great economic importance from the food and feathers supplied by it, especially in the arctic regions where many of its members nest.

REFERENCES.—BENT, A. C., U. S. Nat. Mus. Bull. 126, 1923; Bull. 130, 1925 (courtship, nesting, eggs, sequence of plumages, etc.).—BREWSTER, WILLIAM, Bull. Mus. Comp. Zool., LXVI, Part 1, 67-189, 1924.—BROOKS, ALLAN, Auk, XXXVII, 353-367, 1920.—BRYANT, H. C., Condor, XVI, 217-239, 1914.—COOKE, W. W., Bull. 26, Biol. Surv., U. S. Dept. Agr., 1906 (migration).—CORY, C. B., How to Know the Ducks, Geese, and Swans, 1897.—FORBUSH, E. H., Birds of Massachusetts, I, 173-307, 1925.—GRINNELL, BRYANT, and STORER, The Game Birds of California, 79-262, 1918.—GRISCOM, LUDLOW, Auk, XXXIX, 31-41, 517-530, 1922; XL, 69-80, 1923 (field identification).—JOB, H. K., Among the Water Fowl, 1902.—LEOPOLD, ALDO, Condor, XXI, 122, 128-129, 1919; XXIII, 85-86, 1921 (weights and plumages); XXVII, 8-11, 1925 (duck census); McATEE, W. L., Bull. 205, U. S. Dept. Agr., 1915 (duck foods); Bull. 465, U. S. Dept. Agr., 1917 (duck foods); MILLAIS, J. G., The Natural History of British Surface-feeding Ducks, 1902; British Diving Ducks, 1913 (habits, plumage changes, etc.).—PHILLIPS, J. C., A Natural History of the Ducks, 1922-26.—SAUNDERS, A. A., Auk, XL, 526-527, 1923.—TAVERNER, P. A., Birds of Western Canada, 75-79, 1926.—THAYER, G. H., Concealing-Coloration in the Animal Kingdom, 62-66, 1909.—WETMORE, ALEXANDER, Bull. 217, U. S. Dept. Agr., 1915 (mortality); Bull. 672, U. S. Dept. Agr., 1918 (duck sickness).—WITHERBY, H. F., A Practical Handbook of British Birds, 1920-1924 (sequence of plumages, etc.).—WOODRUFF, F. M., Wilson Bull. XXXV, 4-20, 1923.

SWANS: Subfamily Cygninae

Swans are the largest waterfowl with extremely long necks of 22 to 24 vertebrae. The skin is bare from eye to bill—lores (Forbush).

WHISTLING SWAN: *Cygnus columbianus* (Ord)

DESCRIPTION.—*Length*: About $4\frac{1}{2}$ feet, extent 7 feet, wing 21-22 inches, bill 3.8-4.2. Bill not longer than head, widened near tip; distance from anterior edge of eye to posterior border of nostril much (about $\frac{1}{5}$) greater than distance from latter to tip of bill; tail usually of 20 feathers; *bronchial dilation small or of moderate size*. *Adults*: Pure white, usually with a small yellow spot between bill and eye; bill, legs, and feet black. *Young in juvenal plumage*: "Sooty brownish" on head, neck and back leaden-ashy, rump and tail white or ashy; underparts white with gray wash; iris brown, bill purplish flesh color; legs and feet flesh color (Nelson).

COMPARISONS.—"In flight, swans carry their *extremely long necks* outstretched like cranes, but do not thrust out long legs behind" (Taverner).

The Whistling and Trumpeter Swans are so similar that their final identification must rest on anatomical characters—the Trumpeter's large bronchial dilation (Oberholser) made by the vertical hump of the windpipe, lacking in the Whistling Swan (see diagrams in Taverner, 1926, pp. 112-113).

RANGE.—North America. Breeds mainly north of the Arctic Circle south to Barren Grounds of northern Canada and islands in Hudson Bay; winters mainly on the sea coasts of the United States, most commonly on the Atlantic seaboard; on the Pacific coast from Alaska to Lower California; in the interior on large bodies of open water, from Lake Erie to Louisiana, Texas, and New Mexico.

STATE RECORDS.—Formerly the Whistling Swan occurred in New Mexico as a rare migrant; two were noted November 14, 1846, on the Rio Grande a little south of Socorro (Abert), and one was taken a few years afterwards at Fort Thorn (Henry). About 1903, three stayed for two or three weeks at Patterson (Andrus). On the Carlsbad Bird Reserve a few were noted during the winter of 1911-1912, and 12-15 wintered in 1914-15 (Willetts). [In February, 1920, one was seen on a small lake 6 miles northeast of Albert, Union County; March 21, one at the Rio Grande Gun Club lakes 5 miles southwest of Albuquerque; March 19, 23 were seen by W. R. Britton, U. S. Game Warden, at the same place (Ligon). At Silver City it is of rare occurrence, but one was seen on the Rio Mimbres March 14, 1920 (Kellogg).]—W. W. COOKE.

FOOD.—Aquatic plants, as sedge, pondweed, and wild celery; also dry land forms, worms, insects, small mollusks, and various kinds of aquatic animal life.

GENERAL HABITS.—On the breeding grounds of the Whistling Swan near the mouth of the Yukon, in 1880, Doctor Nelson found a shallow lake grown up with horse-tails that formed "a general rendezvous for all the swans of the vicinity," from one hundred to five hundred being seen in the small area. Their combined cries could be heard for three miles or more and made "a grand and melodious concert" with the "organ-like swell and fall in their notes," while the snowy bodies and beautiful forms of the groups of the graceful birds swinging back and forth made one of the most unique and interesting sights of an experience in the north (1887, p. 92).

A spring flight of Whistling Swans at the mouth of the Detroit River, Michigan, was photographed in 1925, showing over a hundred birds in the passing section (Auk, XLIII, 363, 1926, photograph).

In the spring of 1908, a tragedy occurred in the ranks of the eastern migrants at Niagara Falls. A flock of three or four hundred lit in the Upper Niagara River above the falls, and weakened by struggling with the swift current about a hundred of them were swept over the precipice of the great falls, many being killed against the ice bridge at its foot.

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 130, 281-293, 1925.—FLEMING, J. H., Auk, XXV, 306-309, 1908.—TORREY, BRADFORD, Field Days in California, 80-92, 1913.

[TRUMPETER SWAN: *Cygnus buccinátor* Richardson

DESCRIPTION.—*Length:* 5-5½ feet, *extent* 8 to nearly 10 feet, *wing* 21-27.5 inches, *bill* 4.3-4.7, longer than head. Distance from anterior edge of eye to posterior edge of nostril not much greater than distance from posterior edge of nostril to tip of bill; tail usually of 24 feathers; *bronchial dilation* very large (Oberholser); *windpipe* in sternum with vertical hump (Taverner, 1926, pp. 112-113). *Adults:* Superficially indistinguishable from Whistling Swans except by size but *bill wholly black* (never with yellow spot).

RANGE.—Formerly ranging to Atlantic and Pacific coasts, breeding from near Arctic coast south to Indiana, Missouri, Nebraska, Wyoming, and casually west to British Columbia and Fort Yukon, Alaska (Forbush). Probably still breeds sparingly in the wilder parts of Wyoming (increasing in Yellowstone Park), western Montana, Alberta, British Columbia (Skeena River), and northwestern Canada (Bent). "Still occurs in some numbers from Saskatchewan to the Pacific . . . a certain number wintering in eastern Washington, Oregon, or southern Idaho (Allan Brooks).

STATE RECORDS.—In Colorado the Trumpeter Swan, now nearly extinct, was formerly known as a rare migrant, and it is almost certain that these migrants entered New Mexico, although there are apparently no New Mexico records.—W. W. COOKE.

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 130, 293-301, 1925.—COALE, H. K., Auk, XXXII, 82-90, 1915.—SKINNER, M. P., Roosevelt Wild Life, Bull. III, 153-155, 1925.—TAYLOR, W. P., Wilson Bull., XXXV, pp. 137, 138, September, 1925.]

GEESE: Subfamily Anserinae

In length of neck and usual size the Geese are intermediate between the Ducks and Swans. Unlike Swans the skin between the eye and bill (lores) is completely feathered. Unlike most Ducks, they have no iridescent wing patch (speculum).

CANADA GOOSE: *Branta canadensis canadensis* (Linnaeus)

PLATE 8

DESCRIPTION.—*Length:* About 35-43 inches, *wing* 15.6-21, *bill* 1.5-2.7, *tarsus* 2.4-3.7. *Adults:* Head and neck black with a broad white throat band extending up across cheeks; body mainly brown or brownish gray, feathers tipped with lighter;

rump and tail black, upper and lower tail coverts white; iris brown; bill, legs, and feet black. *Male in eclipse plumage*: Duller. *Young in juvenal plumage*: Similar, but throat and cheeks sometimes mixed with blackish.

RANGE.—Breeds in northern North America south of the barren grounds, from limit of trees in upper and lower valleys of the Yukon, northwestern Mackenzie, and western Hudson Bay region south to Gulf of St. Lawrence, Indiana, Nebraska, northern Colorado, Utah, Nevada, and California; winters from the coast and in southern interior of British Columbia, northwestern Wyoming, South Dakota, Ohio, Maine, and Nova Scotia south to Florida, Gulf coast of Mexico, and southern California.

STATE RECORDS.—In the early days of the settlement of the western United States, the Canada Goose was a common breeder in the Rocky Mountain region south to northern Colorado, but those found by Henry, 1853–1855, at Fort Thorn were nesting 500 miles farther south than their nearest known breeding neighbors.

Henry's record is the only breeding record for the State, but the Goose was formerly an abundant spring and fall migrant and, notwithstanding its greatly diminished numbers, many winter and a few still pass in migration. In 1846 the species was already abundant by September 5 near Sandia, and the latter part of that month at Albuquerque (Emory). Some were heard honking as they flew over Lake Burford September 28, 1904, and five were seen there two days later (Bailey); they were common October 14, 1905, at Jornada (Ligon); and abundant, November, 1853, on the Rio Rito near Laguna (Kennerly). In Henry's time they were fairly common all winter on the lower Rio Grande near Fort Thorn, abundant in February, 1876, near Albuquerque, and still common in April of that year at Algodones (McCauley). [On the Rio Grande near Albuquerque seven were seen December 4 and 30, and others noted December 8, 1916, one specimen being taken (Willett); they are said to winter, arriving in November in 1917 and 1918 (Leopold). On December 5, 1918, nine were seen on the Rio Grande near La Joya (Ligon).] On the Carlsbad Bird Reserve the species was noted in February, 1914 (Wilder), and 41 were noted March 23, 1914 (Cooper); 500 wintered 1914–1915, several flocks were noted January 19, 1915, a flock was seen March 11, 1916; [common in December, 1916, seven seen, December 4; 30, December 8 (Willett). Near La Joya on the Rio Grande 16 were seen and 12 miles north of La Joya 24 were seen on January 16 1920 (Ligon)].—W. W. COOKE.

NEST.—Usually on dry ground, often on an island or a low mound, the top of a beaver house or a rock surrounded by water, sometimes merely a slight hollow lined with a few breast feathers, but at other times made of grass and leaves, lined thickly with gray down. *Eggs*: Usually 5 or 6, "creamy white or dull dirty white at first, becoming much nest stained and sometimes . . . nearly covered with 'cream buff'" (Bent).

FOOD.—Green vegetation, scattered waste grain and sprouting grain, wild berries, aquatic plants, as wild rice, sedges and marsh grasses, insects, especially grasshoppers, bivalves, snails, crustaceans, and small animals found in flooded marshes.

GENERAL HABITS.—The Canada Goose, or Honker, is the familiar Wild Goose of the mountains and zoological parks. In the National Zoological Park at Washington where they nest, their dull eclipse plumage was watched by Mr. Ned Hollister, then superintendent of the zoo. Some pertinent notes on the habits of moulting—eclipsed—Canada Geese are given by Mr. Howley from Newfoundland. He writes: "During the breeding season they moult the primary wing and tail

feathers, and are consequently unable to fly in the months of June, July, and the early part of August. They keep very close during this moulting season, and are rarely seen by day; yet I have frequently come across them at such times in the far interior, and on many occasions have caught them alive. When surprised on some lone lake or river side, they betake themselves at once to the land, and run very swiftly into the bush or tall grass to hide. But they appear somewhat stupid, and if they can succeed in getting their heads out of sight under a stone or stump, imagine they are quite safe from observation. When overtaken in the water, and hard pressed, they will dive readily, remaining a considerable time beneath, swimming or running on the bottom very fast. About the fifteenth of August the old birds, and most of the young ones, are capable of flight, and from thence to the first of September they rapidly gain strength of wing. Soon after this they betake themselves to the seaside, congregating in large flocks in the shallow estuaries or deep fiords, to feed during the nighttime, but are off again to the barrens at earliest dawn, where they are generally to be found in daytime" (1884, pp. 311-312).

In Yellowstone Park, Mr. M. P. Skinner states, about four hundred pairs are supposed to nest. Here, like the Mallards they become very tame, proving an unfailing source of interest to visitors.

The great Canada Goose, which winters in the southern part of New Mexico, is now a comparatively rare migrant, but should be listened for spring and fall. Its "trumpet-like honking" from high overhead may lead to the discovery of a flying wedge, but in whatever formation, singly or in company, the large birds can readily be recognized on the wing by their white throat patches and white upper and under tail coverts, as with slow wing beats they make their way across the sky, some of them, as Doctor Chapman puts it, "embarked on a journey of several thousand miles," but going and coming "as surely as though they carried chart and compass" (Handbook).

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 130, 204-223, 1925.—RAY, M. S., Condor, XIV, 67-72, 1912 (nesting).—MILLER, LOYE, Condor, XXX, 119-120, 1928 (antiquity of migratory instinct).—SKINNER, M. P., Roosevelt Wild Life Bull. III, 98-100, 1925 (in Yellowstone).

[HUTCHINS GOOSE: *Branta canadensis hutchinsi* (Richardson)]

DESCRIPTION.—*Length*: About 25-34 inches, wing 14.7-17.7, bill 1.2-1.9, tarsus 2.2-3.2. Like the Canada Goose but smaller.

RANGE.—Chiefly western North America. Breeds on barren grounds from Kowak Valley, Alaska, and mouth of Mackenzie eastward along Arctic shores and islands from latitude 70° south to Melville Peninsula, Hudson Bay, and Baffin Island; winters mainly in the western United States from British Columbia, Nevada Colorado, Nebraska, and Illinois south to Louisiana, Texas, and Lower California.



From mounted group in Colorado Museum of Natural History

CANADA GEESE

Resting undisturbed on their winter feeding grounds

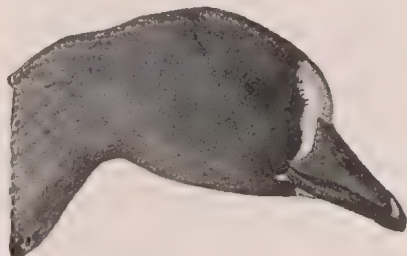
STATE RECORDS.—Geese so small that they were called Brant were seen by Col. Abert October 15, 1846, near Albuquerque and again October 28, near Isleta; these were probably the Hutchins Goose and were so called by Kennerly who found them near the latter place in November, 1853. But as all of Kennerly's specimens proved to be the common Canada Goose, the smaller subspecies still lacks a certain record for New Mexico. The Hutchins Goose is a rare bird in the southern Rocky Mountains, and as it does not regularly go into Mexico outside of Lower California, it would at the most occur in New Mexico as a rare or casual migrant on the way to its winter home in eastern Texas. A flock was reported as seen at Albuquerque, October 7, 1900 (?) (Birtwell), but as no specimen was secured and sight identification in this case is very uncertain, the species can not yet be given a place in the New Mexico bird list.—W. W. COOKE.

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 130, 223-227, 1925.]

WHITE-FRONTED GOOSE: *Anser albifrons gambeli* (Hartlaub)

DESCRIPTION.—*Length*: About 29 inches. *Adults*: Forehead white, head, neck, and body mainly dark brownish gray, upper tail coverts mainly white; breast and belly dark gray, broadly banded with black; bill varying from flesh color or pink to orange, nail whitish, legs and feet yellow or orange. *Young in juvenal and first winter plumage*: Similar, but without white front and black breast patches; breast often mottled.

RANGE.—Nearly circumpolar. Breeds on the barren grounds and Arctic coasts of North America from northeastern Siberia east to northeastern Mackenzie and south to lower Yukon Valley; winters in Japan and in North America, from British Columbia to Mexico and rarely central and southeastern United States.



From Handbook of Western Birds

FIG. 8. White-fronted Goose

STATE RECORDS.—A White-fronted Goose collected by Henry at Fort Thorn, in the fall of 1854 was described as a new species by Baird under the name *frontalis*. Later the specimen was ascertained to be the young-of-the-year of what now appears to be the ordinary White-fronted Goose. The species is a rare migrant in the Rocky Mountain region and this specimen is the only one recorded for New Mexico. The White-fronted Goose was reported to George Willett by several hunters as occurring in the vicinity of Carlsbad in January, 1915, and he writes that he is personally satisfied of the authenticity of the record.—W. W. COOKE.

SNOW GOOSE: *Chen hyperboreus hyperboreus* (Pallas)

DESCRIPTION.—*Length*: About 23-28 inches, wing 14.5-17, bill 1.9-2.3, tarsus 2.8-3.2. Feathers of neck forming grooves. *Adults*: Pure white, except wing which has black tip and gray patch; white of foreparts sometimes washed or stained with rusty orange; iris brown, bill, legs and feet pinkish. *Young in juvenal plumage*: Head, neck, and back, pale gray, feathers edged with brown; wing quills black, closed wing brown with white edgings; rump, upper tail coverts, tail, and underparts white; head and underparts usually tinged with yellowish brown.

RANGE.—North America and northeastern Asia. Breeds in arctic America from northern Alaska and mouth of Mackenzie eastward to Melville Island (prob-

ably), Hudson Bay, Baffin Island, and on other arctic lands north of the North American Continent; winters in temperate North America from British Columbia, Nevada, Utah, southern Colorado, Illinois, and Connecticut south to the Gulf coast, central Mexico, and northern Lower California. Uncommon east of the Mississippi, most abundant in California, Mexico, Texas, and Louisiana.

STATE RECORDS.—The earlier zoological explorers in New Mexico found Snow Geese common in fall migration; Emory notes them as abundant in migration September 29, 1846, near Albuquerque; Abert records them as abundant October 20–31, 1846, near Isleta and Laguna; McCall saw them in 1851 while crossing the southern part of the State; and about the same time Henry noted them near Albuquerque. A single white Goose in a flock of Canada Geese is reported as seen November 22, 1906, near Isleta (Stafford). [One was shot on the Rio Grande, January, 1917, and another white bird taken for the species, seen at a distance over the Gila in June, 1917, possibly a wounded one left behind in migration (Merrill).]—W. W. COOKE.

FOOD.—Stems and roots and tubers of aquatic plants, green vegetation, and grain (largely waste), wild berries, and insects.

GENERAL HABITS.—When the Lesser Snow Goose is flying over, its shrill *honk* can readily be distinguished by the experienced listener from the hoarse sonorous *honk* of the Canada Goose. In the southward migration of waterfowl, known as the "northern flight," the white geese reach North Dakota the first or second week in October. When they reached the Sweetwater Lakes in 1915, I was told, they came in a column about a mile and a half wide, flying low over windmill and barn, and could be seen coming from the east as far as one could see and going into the west "until they were as small as swallows." They stayed in the neighborhood till driven away by hunters and would spend the night on a large open lake, and go out to feed in the stubble fields "about sunup," returning from ten to twelve, going out again between two and four, and returning about sundown. They would go miles to feed, choosing, when possible, burnt barley fields as the kernels of waste grain could be easily seen on the blackened ground.

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 130, 164–173, 1925.—GRINNELL, BRYANT, and STORER, Game Birds of California, 7–9, 210, 215, 1918.

RIVER DUCKS: Subfamily Anatinae

While not confined to fresh waters, the River Ducks frequent marshes and inland waters so much more than the Sea Ducks that they are known as Surface-feeding Ducks, and by sportsmen as Puddle-Ducks. Feeding mainly in shallow water, they seldom dive; so the feet are smaller than in the Sea Ducks, the toes and webs less highly developed, and the hind toe without a lobe. "Their bills are proportionally longer, flatter, and more adapted to dabbling in water than those of Sea Ducks, reaching a wonderful perfection in the Shoveller" (Eaton). The color pattern of the drake on head, wings, and rear flanks is abruptly

broken, perhaps "for self-protection as well as rivalry, the apparent discontinuity of outline rendering the bird invisible as he sits motionless on the shore or amongst the grass and sticks" (Eaton). Both sexes usually have a bright iridescent mirror, speculum, or beauty spot and elaborate color patterns on the wing used in courtship display, as various handsome wing markings are in other species. Nearly all the conspicuously marked drakes have a post-nuptial molt into a dull "eclipse" plumage as obscure as that of the brown, mottled females. The eclipse plumage elaborately figured by the English naturalist and artist J. C. Millais in his *British Surface-feeding Ducks* is generally little known and offers an interesting subject for observation. It serves for protection during the period when, unable to fly because of the simultaneous loss of all their wing quills, the drakes leave their mates and withdraw to some protected reedy ground within reach of water wide enough for them to escape their enemies without flight, in which safe harbor they can complete their molt. In this environment, where as Mr. Thayer says they skulk among the reeds, a mottled grass and reed-like pattern harmonizes better with their surroundings, than the "pied, water-pattern" of the full plumage. In the fall, by a second partial molt, the drakes resume their former handsome plumage, which they keep until after the next breeding season, so appearing in both spring and fall migrations in their full coloration.

The Surface-feeding Ducks eat so many mosquito larvae and pupae that they have been used by the Pennsylvania Health Commission to keep down the mosquitoes in swamps expensive to drain. They also feed upon other insects and their larvae, mollusks, crustaceans, and the seeds and roots of aquatic plants. "The 'gutters' on the sides of the bill act as strainers, and after probing the bottom, the mere act of closing the bill forces out the mud and water taken in with the food. They do not gather in such large flocks as the sea ducks, and in our waters are generally found in groups of less than fifty" (Chapman's *Handbook*).

REFERENCES.—MILLAIS, J. G., *The Natural History of Surface-feeding Ducks*, 1902.—ROBERTS, T. S., *Biennial Rept. State Fish and Game Comm. Minn.*, 62-64, 1919.

MALLARD: *Anas platyrhynchos platyrhynchos* Linnaeus

DESCRIPTION.—*Length:* About 20-25 inches, wing 10.2-12, bill 2-2.4, tarsus 1.5-1.8. *Adult male in winter and breeding plumage:* Head and most of neck iridescent green, with narrow white collar above rich chestnut breast; upper back with brown medium streak bordered by gray; rump and tail coverts (upper and under) black, four middle tail feathers black, recurved, outer ones largely white; speculum purple enclosed by black and white bars; axillars and wing linings white; belly gray marked with fine wavy lines; iris brown, bill greenish yellow, legs and feet orange-red. *Adult male in post-nuptial eclipse:* Bill greenish but head without green, neck without white collar, underparts without chestnut or gray vermiculations and

tail without recurved feathers; head and body brown, variously spotted, streaked, and scalloped with darker. *Adult female in winter and breeding plumage:* Head and neck finely streaked with brown, eye streak dusky; underparts dark brownish becoming blackish on lower back, body variously mottled, scalloped, and streaked with dusky and buff, buff predominating on belly, *flanks coarsely mottled*; under tail



From Handbook of Western Birds (Fuentes)

FIG. 9. Mallard

coverts and tail brown, tail with pale buffy edgings and markings; speculum like male, under wing coverts white, under tail coverts brown; bill variable, orange or greenish, blotched with black; legs and feet pale orange-red. *Young in juvenal plumage:* Similar to female but darker and more brownish, legs and feet duller.

COMPARISONS.—The female Mallard may be told from the female Pintail by shorter neck and white instead of dark mottled wing linings; from the female Baldpate by coarsely mottled instead of plain pinkish brown flanks; from the female Gadwall by two narrow white

bars bordering the blue speculum instead of one small white patch (Hoffman).

RANGE.—Northern Hemisphere. In America breeds from Aleutian and Pribilof Islands, northwestern Alaska, northern Mackenzie, northern Manitoba, west coast of Hudson Bay south to Virginia, Indiana, Missouri, Kansas, southern New Mexico, Arizona (probably), and Lower California; winters from the Aleutians, central Alaska, Montana, Nebraska, and Wisconsin east to Maryland and south to Lesser Antilles, Panama, and Mexico.

STATE RECORDS.—The Mallard is one of the most widely distributed ducks of the world, breeding in North America from the Arctic regions south to the central United States, and in the Rocky Mountains to southern New Mexico; although, while breeding commonly south to Colorado, in New Mexico it finds few places suited to its needs. It has been reported breeding at [Coyote Creek (near Black Lake), about 7,800 feet (Piper)]; Halls Peak, 8,000 feet (Barber); Chloride, 8,500 feet (Blinn); Turrieta Lake (east slope San Francisco Range near Joseph) (Andrus); on the V+T Ranch (about 80 miles southwest of Magdalena), and at Pasa-monte, Union County. At Mayberry Lake (some 60 miles west of Magdalena), about 80 birds were noted April 26, 1915; it was found rather common at Lake Burford, July 17, 1913, and not through laying, though many miles farther south near Beaver Lake (Gila Forest Reserve), 7,500 feet, young were noted June 6, 1913. [In the San Simon Marshes, about 4,000 feet, May 9, 1920, one nest with eggs and three broods of young were noted. Adults were found May 27–June 22, 1924, on lakes east of Dexter and at the White Lakes and others northeast of Roswell, but there were no places for them to nest as stock kept the grass eaten down (Ligon).] A few are noted irregularly through the summer at Mesilla (Merrill); and they probably breed sparingly in the neighboring shallow lakes. [Along the Rio Grande within 50 miles of Albuquerque, in 1917 and 1918 they were observed nesting (Leopold). At Lake Burford, May–June, 1918, they were among the commonest breeding ducks, it being estimated that 40 pairs were preparing to nest (Wetmore). Between Belen and Socorro and south to San Marcial, they probably nest in the

marshes, as they were observed from the trains; and on July 14, 1918, an old one followed by eight young about two weeks old was seen a mile southeast of Socorro (Ligon).]

The flocks begin to arrive from the north late in August and during the fall migration they range to the tops of the Chuska Mountains above 8,000 feet, and to about 9,500 feet in the Brazos Canyon of the San Juan Mountains (Bailey). [Between Socorro and Albuquerque, August 28 and September 4, 1917, many were seen (Ligon).] They are most common from late September through October. Common at Clapham and Perico, November 15, and a male shot from a bunch of seven, December 26, 1893 (Seton). [In 1917 and 1918 they were the commonest ducks on the Rio Grande near Albuquerque during the shooting season (Leopold).]

Their numbers decrease in November but many remain all winter in southern New Mexico and are reported near Fort Thorn (Henry), Mesilla (Merrill), Albuquerque, January 15, 1894 (Loring), and near Bear Canyon, east of the San Andres Mountains, January 15, 1903 (Gaut). These places are from 3,800 to 5,500 feet altitude. Along Cuchillo Creek, between Chloride and Cuchillo, a male and two females were seen, December 22, 1915 (Ligon). On the Carlsbad Bird Reserve, in 1914, the species was noted in February (Wilder); it was abundant, January, 1915; noted in the winter of 1915-1916; (500 were estimated December, 1916; also on the Rio Grande Bird Reserve (Elephant Butte), 400 were noted November 23-December 9, 1916, and they were said to breed near by (Willett); reported as sometimes wintering in Colfax County (Charles Springer, 1925).]

The spring migrants are most common in March—noted March 6; 150, seen March 13; about 600, March 23; 300, March 24 and 25; and 20, April 29 (Cooper);—although soon after early April most of them depart for their more northern breeding grounds.—W. W. COOKE.

NEST.—On the ground, usually near water, hidden in grass, weeds, bushes, or dry reeds, made of leaves and grasses and thickly lined with dark gray down. **Eggs:** Usually 6 to 10, light greenish rather than buffy.

FOOD.—"The Mallard is one of our most omnivorous ducks, and nothing in the way of mast, grain, or small animal life comes amiss . . . it has the habit, shared to the same extent by no other duck, of resorting to the stubble for waste grain" (Henshaw). Among the articles of its varied diet are seeds, stems, leaves, rootstalks, and tubers of sedges, wild grasses, smartweeds, pondweeds, duckweeds, coon tail, wild rice, wild celery, musk grass, frog bit, eel-grass, wild millet, delta duck potato, water elm, and hackberry, seeds of wapato, also acorns; and in animal food, aquatic insects, grasshoppers, dragon fly nymphs, beetles, snails, shellfish, and an occasional meadow mouse or frog. "Mallards are very destructive to the larvae of mosquitoes . . . clearing stagnant pools where mosquitoes breed" (Forbush).

GENERAL HABITS.—The progenitor of our domestic duck, the large Mallard or Green-head "is well known over nearly the whole northern hemisphere," while the Mallard bred in domestication, as Mr. Forbush says, "forms an important part of the food supply of China, the most populous country on the globe"; the Pekin duck now being the staple stock of many a huge poultry plant in America. It is also "the chief water-fowl of most game preserves, on some of which 10,000 birds are reared annually." It is the best species for wild-duck farming, an industry which, as Mr. McAtee says, "should be developed as extensively as possible in order to supplement the decreasing natural supply of game" (1918, p. 2).

In New Mexico, on Lake Burford late in September, 1903, we found small parties of Mallards—from two to twelve—feeding in marshy places and in flooded weedy bottoms where they were enjoying the rich store of smartweed, pigweed, and other seeds; and as they fed, the loud barnyard quack of an invisible female was sometimes answered quickly by the slazy note of the invisible drake. When out in sight, they characteristically stood on their heads to reach down to the water weeds, with tails and feet sticking up above the water, and the significance of the striking colors of feet and tail found in pond and river ducks seemed apparent. For what better means could be devised by nature for keeping mates together during the breeding season, and misleading enemies ready to swoop down upon anything but—simulated—sticks projecting above the surface of the water. In the case of the drake Mallard there were not only the black tail coverts and white tail quills which suggest the points of snags rather than ducks, but also spectacular bright red feet conspicuous above the water.

While the Mallards are preeminently “surface-feeding ducks,” the three-quarters grown young, as Mr. Millais in his interesting book on the Surface-feeding Ducks, says, being “unable to fly, gain much of their food by diving.” He describes a “clever trick” used by the adults to bring up the worms from the mud. Sitting upright, balancing themselves on their tails, they tread water—work their feet rapidly up and down—until the mud is thoroughly churned up, when the worms “come up to find out what is going on, and are promptly swallowed for their pains” (1902, p. 4). By another ruse they escape an enemy overhead, lying prone on the water with neck outstretched, and if approached, sinking the body until it is almost invisible.

Although, as Doctor Wetmore says, Mallards are undemonstrative ducks, they have a mating flight similar to that of the Gadwall, in which two males and one female rise in the air together and fly along rather slowly, with the female flying beside first one and then the other of the males. In turn these swing in ahead of her and setting their wings throw up their heads and display their back and wing markings. During this performance the males call constantly, while the female quacks at intervals. When flushed from her eggs, I have heard a Mallard apparently call her mate and with him circle around overhead, gauging the danger before returning to the nest. When alone with her brood, one seen by Mr. M. P. Skinner showed surprising ingenuity in dealing with an enemy. The family of young were pursued by a muskrat who was “almost upon the duckling in the rear when the mother saw the danger and in an instant was there *scooping water with her wings into the rat's face*” (1925, pp. 40–41). By this remarkable device she gained time and although she had to drive off the pursuer twice more, she finally got the brood safely to shore. It is also interesting to hear from Dr. C. W.

Townsend that during courtship the drake, besides bowing to the duck, "rears himself up in the water," apparently to display his richly colored breast (1916, p. 13). He may also display his handsome feet as do some of the other drakes.

At Lake Burford Doctor Wetmore found that while the females were at the nest the males remained from a hundred yards to half a mile away, standing on shore or swimming in open water. These males were alert and called instantly at the approach of danger. "As early as May 29, drakes that had finished breeding were banding together . . . A bird that was molting into eclipse was noted on June 4, and from then on birds in changing plumage were common. In this molt they first become dull in color about the head and at the same time lose the recurled upper tail coverts. A male almost entirely in eclipse plumage was seen on June 18" (1920a, p. 239). (See Millais, 1902, pp. 18-23—eclipse.)

One of the Mallard drakes taken on Lake Burford on September 28 was mainly in winter plumage, but both his green head and his mahogany breast were still spotty with the dull feathers of his "eclipse." In the region of Albuquerque, by October 16, Mr. Aldo Leopold states, the drakes have the chestnut breast patch, the white ring around the neck, and the green head well developed. There are still spots and black wash on the underparts and rusty feather tips on the head as well as undeveloped curly feathers above the tail, but the general effect is unmistakable. By November 15, practically full adult plumage is attained. The molt of the female Mallard, Bonhote tells us, is postponed until the young can fly, and as soon as her quills are grown again, "the family moves off to join the flocks which are now rapidly forming." An interesting local example of what Mr. Leopold denominates "differential sex migration" is given by him in his study of Mallards on the Rio Grande near Albuquerque. "When the season opened in October," he says, "there was a notable preponderance of hen Mallards . . . by the first week in November this preponderance of hens disappeared, and until the main flight was over, about December 1, there was a preponderance of drakes. Among the Mallards wintering here, after the main flight was over, the proportion of drakes to hens was normal" (1919e, p. 182).

During the shooting seasons of 1917 and 1918, Mr. Leopold kept an interesting plotted record of plumages and weights of ducks taken. He says that the curves for all species are flat for the period October 16–November 1. The curves for all species show an increase in weight from November 1 to November 15. After November 15, the curves are subject to sudden drops, and during the winter period to very gradual drops. The sudden drops appear to be coincident with severe general storms. The gradual winter drop seems obviously due to cold weather and scarcer feed. The fall ducks are very fat, but the heaviest killed by Mr.

Leopold was a Mallard drake taken November 15, 1918, which weighed $3\frac{1}{4}$ pounds. The lightest drake, taken December 1, 1918, weighed 2 pounds. The average weight in November when they are fat is $2\frac{5}{8}$ pounds. Mallard hens weigh from $1\frac{3}{4}$ to $2\frac{3}{4}$ pounds, their curves paralleling those of the drakes with apparently a constant difference of a little more than half a pound.

Among the ducks that Mr. Ligon has found trying to winter at high altitudes was a flock of about a hundred and fifty—apparently all Mallards—seen January 13, 1916, gathered in a mass on a small patch of open water on the otherwise solidly frozen surface of the V + T Lake northwest of Chloride, at an altitude of about 7,000 feet. Though there was an abundance of running water a few miles away on the East Gila, the ducks apparently found some food that held them here, and as Mr. Ligon says, the heat from their bodies and their stirring of the water kept their pool open, when all the rest of the lake was frozen (MS).

In winter in Wisconsin, Ned Hollister wrote, "at different times I have crawled close to small spring-holes near the tightly frozen creeks and found the open water actually covered with Mallard drakes in perfect plumage, the brilliant green heads in mass beautiful against the background of snow" (1920a, p. 37).

ADDITIONAL LITERATURE.—BENT, A. C., Auk, XVIII, 332-333, 1901; U. S. Nat. Mus. Bull. 126, 34-47, 1923.—FORBUSH, E. H., Educational Leaflet, 36, Nat. Assoc. Audubon Soc.—HOLLISTER, NED, Condor, XXII, 36-37, 1920 (segregation of males).—LEOPOLD, ALDO, Condor, XXI, 182-183, 1919 (migration).—LINCOLN, F. C., Tech. Bull. 32, U. S. Dept. Agr., 13-21, 1927 (returns from banded birds).—MABBOT, D. C., U. S. Dept. Agr. Bull. 862, 1920.—McATEE, W. L., U. S. Dept. Agr. Bull. 720, 1918; Farmers' Bull. 1521, 46-53, 1927.—ROCKWELL, R. B., Condor, XIII, 121-124, 1911.—SAUNDERS, A. A., Condor, XVI, 131, 1914.—SKINNER, M. P., Birds of Yellowstone Park, 144-152, 1925.—WETMORE, A., Auk, XXXVII, 238-240, 1920; U. S. Dept. Agr. Bull. 1145, 1923.

NEW MEXICAN DUCK: *Ánas dfazi novimexicana* Huber

DESCRIPTION.—*Male*: Length 21.8 inches. *Adult male in spring*: Forehead and top of head black streaked with pinkish buff; sides of head and neck pinkish buff streaked with black; throat pinkish buff, unstreaked; *breast black*, margined and mottled with cinnamon, turning to vinaceous-buff on belly; under tail coverts black, feathers edged with whitish and rufous; *back, rump, and upper tail coverts black*, streaked and margined with brown and buffy; wing quills dark brown, *speculum dark bluish violet, bordered by black and white bands*; under wing coverts white; bill yellow, and feet and legs orange, in life. In fall, much darker, and edgings of feathers much deeper cinnamon; feathers of throat streaked with black (Huber).

RANGE.—In New Mexico, Rio Grande Valley from Albuquerque south to El Paso, Texas.

STATE RECORDS.—The Black Duck was reported by Henry in 1855 as rare, a few seen on the Rio Grande every spring, on their passage north. These as well as a few later records of the Black Duck from New Mexico apparently belong to the New Mexican Duck described by Wharton Huber. Leopold says it is common

from early in fall to the middle of November, sometimes as common as the ordinary Mallard. Specimens were taken by Mr. Huber at Mesilla Dam, April 12, 1915; and along the Rio Grande near Las Cruces, May 7, 1915; also by Leopold, at Belen, December 7, 1917.

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 126, 48-50, 1923.

GADWALL: *Chaulelasmus streperus* (Linnaeus)

DESCRIPTION.—*Male*: Length 19.2-21.7 inches, wing 10.2-11, bill 1.6-1.7, tarsus 1.4-1.7. *Female*: Length about 18 inches, wing 10-10.2, bill 1.5-1.6, tarsus 1.6. *Weight*: About 1½ lbs. (Leopold). *Adult male in winter and breeding plumage*: Head and neck pale brown usually finely speckled with black, darkest on top of head; throat brownish gray, minutely flecked with dusky; back and sides with wavy transverse bars or vermiculation of blackish brown and white; feathers of breast with scaled effect; *wing patches white and reddish brown* with black band; scapulars broadly edged with yellowish brown; axillars and wing linings white; *upper and under tail coverts black*; tail brownish; iris brown, bill dusky, *legs and feet orange*. *Adult male in post nuptial eclipse*. Top of head brownish black, back, rump, and upper tail coverts without vermiculation, feather markings mainly coarse, blackish brown, margined with rusty, with long light streakings on back; *wings and tail normal*; breast dull rusty, feathers with central black crescent; belly dull white, feathers with central brown spots. *Adult female and young*: Brown, streaked, and spotted, *wing patch white* and markings similar to those of male but restricted; chin and belly white, belly spotted in summer; legs and feet pale yellow.

COMPARISONS.—The females of Gadwall, Baldpate, and Pintail may easily be confused when on the wing, but the Pintail has a long neck, the Baldpate shows conspicuous white patches on the fore part instead of rear edge of wing, and the Gadwall is darker on back and rump, and has a white speculum and belly. (See pp. 116, 118.)

RANGE.—Mainly Northern Hemisphere. In America breeds from southern British Columbia, Saskatchewan, and Manitoba south to Iowa, Louisiana, Texas, New Mexico, and southern California; winters from southern British Columbia (rarely), Washington, Utah, northeastern Colorado, Arkansas, eastward to Maryland and south to Florida, central Mexico, and southern Lower California.

STATE RECORDS.—Though the Gadwall is known to nest in the San Luis Valley, Colorado, and elsewhere near the Colorado-New Mexico line, the only certain record of its nesting in New Mexico is at Lake Burford where it was breeding quite commonly during 1913; on August 10 of that year the young were about two-thirds grown (Ligon). [In July, 1916, they were breeding freely at Lake Burford, many young being observed (Ligon), and in June, 1918, about 60 pairs were breeding (Wetmore). On the Rio Grande Auto and Gun Club Lake, 6 miles southwest of Albuquerque, they were seen on June 16, 1919 (Ligon). They are seen on the mountain lakes in Colfax County (Charles Springer, 1925).] Two old birds taken near Lake Burford at Horse Lake, September 23, 1904, were only just beginning their fall molt (Bailey).

The Gadwall enters New Mexico in August as a common migrant, in favorable localities up to 7,500 feet, at Beaver Lake (Bailey), and to 8,800 feet on the top of the Chuska Mountains (Birdseye). At these higher altitudes the approach of winter compels it to leave early in October, but it is still common a thousand feet lower until the latter part of the month—Datil, October 15, 1905 (Hollister); near Koehler Junction a large flock October 20-24, 1913 (Kalmbach); [Rio Grande near Albuquerque, sometimes a few in the middle of October (Leopold, 1919)]; San Rafael, October 26-31, 1908, where seen sitting on the ice around small open places on cold mornings (Bailey)—and along the lower Rio Grande, where they remain all winter (Henry).

They were seen as late as November 19, 1873, on the Zuni River near the New Mexico-Arizona boundary (Henshaw). On the Carlsbad Bird Reserve they were observed in February, 1914 (Wilder); reported as common in January, 1915; noted during the winter of 1915-1916; [and 600 estimated December, 1916; also on the Rio Grande Bird Reserve (Elephant Butte), they were noted November 23-December 9, 1916 (Willett).]

A late spring migrant was taken April 26, 1892, near the southern boundary of the State 100 miles west of El Paso (Mearns). [In 1916, they were reported as rather common over the State in migration.]-W. W. COOKE.

NEST.—On dry ground usually near water, in grass or weeds, or under bushes; made of finely shredded grasses or tules; lined with fine grass and very dark-colored breast down. *Eggs*: 8 to 12, pale buff or creamy.

FOOD.—Algae, tender shoots of grasses; blades, tubers, roots, and seeds of aquatic plants, as scirpus, pondweeds, widgeon grass, ruppia, and moon-tail; nuts, acorns, insects, as beetles and dragon flies; and also mollusks, tadpoles, frogs, crawfish, and other small forms of aquatic life.

GENERAL HABITS.—The name of Creek Duck suggests the habits of the Gadwall, whose dull brown dress makes it inconspicuous when feeding along the reedy or grassy shores of creeks, shallow ponds, and lakes. Like the other shallow-water ducks it often feeds standing on its head in the water, the orange feet of the drake distinguishing him from the red-footed Mallard. The quack, frequently given on the wing, is higher and somewhat shriller than that of the Mallard. The male has, as Doctor Wetmore describes it, "a loud call like *kack kack*, a deep reed-like note resembling the syllable *whack*, and a shrill whistled call."

At Lake Burford, in the summer of 1918, Doctor Wetmore found Gadwalls the commonest of the shallow-water ducks, and their mating flight, like that of the Mallards only given with more dash and speed, was constantly seen. It began by two males approaching a female in the water, calling and bowing. When she rose, mounting the air, they followed, calling and whistling constantly, darting from side to side and rising now rapidly and now slowly, frequently climbing three hundred yards or more into the air. The remarkable display of handsome wing and back markings, was made at first by one and then the other male swinging in ahead of her, but as the days passed the favored suitor displayed oftener, flying so close to her in passing that his wings often struck hers, making a rattling noise, and after a short time the second male often left the pair and returned to the water.

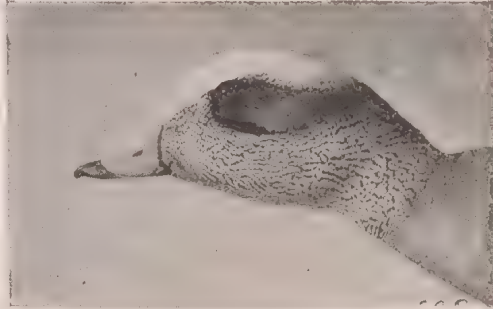
ADDITIONAL LITERATURE.—BENT, A. C., Auk, XVIII, 333-335, 1901 (nest); U. S. Nat. Mus. Bull. 126, 77-85, 1923.—WETMORE, ALEXANDER, Auk, XXXVII, 240-241, 1920.

BALDPATE: *Maréca americana* (Gmelin)

DESCRIPTION.—*Length*: 18-22 inches, wing 10.2-11, bill 1.3-1.5, tarsus, 1.4-1.6. *Weight*: 1¼ to 1¾ lbs. (Leopold). Bill small. *Adult male in winter and breeding plumage*:¹ *Top of head white, encircled from eye backward by*

¹ Mr. Aldo Leopold reports that near Albuquerque the adult male plumage (whether from the immature or the eclipse, or both, is not known) is acquired November 15-December 1.

wide green band, rest of head and neck finely spotted; back mainly vinaceous brown, marked with black, fading to whitish on central upper tail coverts, outer coverts mostly black; *wing with large white patch*, and metallic green joined by *velvety black of speculum*; flight feathers dark brown or black edged with white; axillars white, wing linings pale ash gray; *chest and sides vinaceous*, belly white; *white flank patch sharply contrasting with black under tail coverts*; iris brown, bill grayish blue, with black tip, legs and toes bluish gray, yellowish or brown, feet with dark webs. *Adult male in post nuptial eclipse*: Head without white or green, sides without bright vinaceous, undertail coverts spotty. *Adult female and young*: Head and neck thickly spotted, upper parts grayish brown barred with yellowish brown; wing as in male but white above chiefly replaced by brown, speculum dull black, occasionally with a small patch of metallic green; rump and tail coverts brown, under coverts banded with white; breast dull brown, sides and flanks deep reddish brown.



From Handbook of Western Birds

FIG. 10. Baldpate

RANGE.—Breeds from northwestern Alaska, the mouth of the Mackenzie, and Hudson Bay south to Indiana, Kansas, northern New Mexico (probably), Colorado, Arizona (probably), Utah, Nevada, and northeastern California; winters from southern British Columbia, southern Nevada, central Utah, Arizona, northeastern Colorado, southern Illinois, and eastward to the Atlantic south to Lesser Antilles, and Costa Rica.

STATE RECORDS.—[In June, 1918, at Lake Burford two pairs of Baldpates were apparently nesting, and single males were occasionally seen (Wetmore). They are found on the mountain lakes in Colfax County (Charles Springer, 1925).] During both spring and fall migration they are common in New Mexico and are also found in winter in the northern part of the State; [common near Albuquerque in 1917 and 1918 (Leopold)], and in the southern part on the Rio Grande and Mimbres Rivers (Henry); [on the Rio Grande Bird Reserve, November 23–December 9, 1916 (Willett)]; on the Pecos (Carlsbad Bird Reserve), February, 1914 (Wilder); and in January near Bear Canyon east of the San Andres Mountains (Gaut). The species was fairly common in migration the latter part of September, 1904, at Burford and La Jara Lakes, about 7,000 feet, in flocks of 12 to 20 (Bailey). It was equally common to late March, 1856, on Delaware Creek (Pope), and to March 20, 1904, near Santa Fe; noted after April 15 near Rinconada at 6,000 feet (Surber). On the Carlsbad Bird Reserve it was noted on March 6; 200 estimated, March 13; and 300 March 23, 1914 (Cooper). One was noted April 15 at Silver City (Hunn), and it was recorded as late as May 9, 1910, near Santa Rosa (Lantz and Piper).—W. W. COOKE.

NEST.—Usually on dry ground often some distance from water, generally concealed in grass, weeds, or bushes, made of dry grass and weed stems lined with an abundance of light gray down. *Eggs*: 7 to 12, deep cream to nearly buffy white.

FOOD.—Roots, seeds, and leaves of aquatic plants, as wild rice, wild celery, and pondweeds; tender vegetable shoots; beechnuts, snails, and aquatic insects. The gizzard of one taken at Lake Burford September 27, 1904, contained sand and small seeds, mainly pondweed.

GENERAL HABITS.—Formerly one of the most abundant of ducks, the Baldpate, whose name describes it, has been greatly reduced in numbers by sportsmen and market hunters. "Like most other ducks," Mr. Henshaw wrote, it is "fond of wild celery, but as its skill as a diver is small, it essays the role of highwayman, and when a Canvasback or Redhead appears on the surface with a bill full of the coveted grass, the fruit of honest toil, it snatches the booty and makes off with it" (1915, p. 110).

In the fall migration, September 27, 1904, a Baldpate was taken still in old worn plumage but with its body bristling with pinfeathers.

In flight the wings of the Baldpate make a whistling noise, and when feeding, Mr. Eaton notes, the male gives its "mewing whistle resembling the syllables *whew, whew*," while the female has "a loud cry like the syllables *kaow, kaow*" (1909, p. 191). During courtship, Doctor Townsend observes, "he continually emits gentle but eager whistling notes, and with neck extended and head low, bill wide open and wings elevated behind so that the tips are pointed up at an angle of forty-five degrees, he swims rapidly over the water behind or beside the duck. Occasionally he pecks playfully at the side of her head, and now and then in his excitement jumps clear of the water and flies for two or three yards" (1916, p. 15). The mating flight, similar to that of the Mallard and Gadwall but given with still more spirit, was witnessed by Doctor Wetmore at Lake Burford.

ADDITIONAL LITERATURE.—BENT, A. C., Auk, XVIII, 335-336, 1901.

AMERICAN PINTAIL: *Dáfila acúta tzitzihóa* (Vieillot)

DESCRIPTION.—*Male*: Length about 26-30 inches, wing 10.2-11.2, middle tail feathers 7.2-9.5, bill 1.8-2.1, tarsus 1.5-1.8. *Female*: Length 21-23.5 inches, wing 9.6-10.1, middle tail feathers 4.5-5, bill 1.8-2.1, tarsus 1.6. *Weight*: Early arriving hens, 1¼ lbs.; late drakes, 2½ lbs. (Leopold). *Neck long*, bill slender, *tail of male with central feathers much elongated*, of female and young, tapering and pointed but not elongated. *Adult male in winter and breeding plumage*:¹ *Head with snuff brown patch*, with green and purplish gloss, *cut next to hind neck by conspicuous white streak* extending up from white underparts, fore-back and sides gray, finely lined; long middle tail feathers black, long scapulars striped with velvety black and silvery gray; speculum coppery or violet bordered in front by brown, and behind by black and white bars; axillars mottled, wing linings grayish brown; iris brown, bill blackish and lead color, legs and feet grayish. *Adult male in post-nuptial eclipse*: Head and neck pale brown without brown patch and white streak; wings with coarse dull brown streaks. *Adult female in winter and breeding plumage*: Brown, heavily marked with blackish on top of head, sides of head and entire neck buffy brown, finely streaked, throat lighter; upperparts and sides with black U-shaped marks and white edgings, wing with speculum dull brown, only faintly iridescent; edge of wing (secondaries) like male tipped with white; wing linings dusky. *Adult female in eclipse plumage*: Similar to winter female but

¹ Mr. Aldo Leopold reports that near Albuquerque full adult male plumage (whether from the immature or the eclipse, or both, is not known) is acquired by January 1.

underparts spotted. *Immature*: "The immature male is variously intermediate between the adult male and female; the immature female resembles the adult female, but the underparts are more heavily streaked or spotted" (Chapman).

RANGE.—North America. Breeds along Bering Sea and Arctic coast from Alaska to west coast of Hudson Bay, rarely to Ontario and New Brunswick south to Iowa, Nebraska, northern Colorado, northern Utah, and southern California; winters from southeastern Alaska, British Columbia, northeastern Colorado, Kansas, and southern Ohio, eastward to New Jersey and south to Porto Rico and Panama; also in Hawaii.

STATE RECORDS.—The spring migration of the Pintail begins early—a specimen was taken February 10, 1856, at Dona Ana (Pope); March 3, 1900, at Mesilla Park (Ford); and by March 16, 1895, the species had reached Halls Peak in the northern part of the State (Barber), while on the Rio Grande near Albuquerque several hundred were estimated March 21, 1914. On the Carlsbad Bird Reserve in 1914 the species was noted in February and also on March 6; several hundred were estimated March 13, and several thousands March 23, but the numbers were beginning to fall off on March 24–25, and only 100 were noted April 27, though 400 were estimated April 29 (Cooper). [At Silver City it is fairly abundant spring and fall (Kellogg, 1927).] It does not breed in New Mexico, but on its return in the fall was noted at Isleta August 24, 1905 (Hollister); was the commonest duck on Maxwell Reservoir near Koehler Junction, seen August 19, and 21, September 2, 6, and 12, and October 7, 1913 (Kalmbach); was noted at Albuquerque, September 16, 1900 (Birtwell); La Jara Lake September 17, 1904 (Bailey); near Santa Rosa September 26, 1902; near Corona, October 15–16, 1902 (Gaut); and until November, 1903, at Patterson (Andrus). [Common in October, 1917 and 1918, on the Rio Grande near Albuquerque and a few seen during the winters (Leopold). On December 9, 1918, 15 were seen on a windmill tank 24 miles northeast of Engle, at about 4,700 feet (Ligon).] They were reported on the Carlsbad Reserve in January, 1915, noted during the winter of 1915–16; [a few small flocks seen, December, 1916 (Willett). On the Rio Grande Reserve (Elephant Butte), 100 were noted November 23–December 9, 1916 (Willett).]—W. W. COOKE.

NEST.—On dry ground, often far from water in grass, weeds, or low bushes, a slight depression sparingly lined with grass, straw, or stubble, and brown down (darker than Shovellers) with whitish centers. *Eggs*: 5 to 12, pale olive-green or olive-buff.

FOOD.—Seeds and stems of rushes, duck weeds, pondweeds, wild celery, wild millet, wapato, coon-tail, musk grasses, frog bit, widgeon-grass, and other water plants; beechnuts, acorns, berries, and insects, including grasshoppers and mosquitoes, and also crustaceans.

GENERAL HABITS.—The Pintails feed in the shallows with Shovellers and Blue-winged Teal. When standing erect the handsome drake is easily recognized by his long upreared neck with its striking white finger streak, and when sleeping with head in feathers can be recognized by the large white ball made by his white underparts; while the long-necked, slender brown duck may be told close at hand by her narrow bill, slightly pointed tail and U-shaped markings, and on the wing by the white-tipped secondaries that make white bands at right angles to her brown body. The little brown teal of the neighborhood can be distinguished from their larger sisters by size and told apart by their wing

markings. The male Pintail utters "a loud *qua, qua*," in flight, and has also a mellow whistle, while the female has "a hoarse muffled quack and several low notes."

When hunting ducks on the Rio Grande on October 20, 1918, Mr. Aldo Leopold saw a remarkable sight from his blind. A very severe hailstorm set in, and as he says, "During the thick of the storm I discovered that a flock of about forty Pintail ducks had settled in my decoys not twenty yards distant. Each bird was facing toward the storm, and *each had his head and bill pointed almost vertically into the air*. The flock presented a very strange appearance, and I was puzzled for a moment as to the meaning of their strange posture. Then it dawned on me what they were doing. In a normal position the hailstones would have hurt their sensitive bills, but *pointed up vertically the bill presented a negligible surface from which hailstones would naturally be deflected*. The correctness of this explanation was later proven by the fact that a normal position was resumed as soon as the hail changed into a slow rain" (1919a, p. 87).

A female Pintail that Mr. Bent flushed from a slough in North Dakota dropped into the water near him and "began splashing about in a state of great excitement" although her young were not in sight. As he says, "during all the time, for an hour or more, that we were wading around the little slough, that Pintail watched us and followed us closely, flying about our heads and back and forth over the slough, frequently splashing down into the water near us in the most reckless manner, swimming about in small circles or splashing along the surface of the water, as if wounded, and often near enough for us to have hit her with a stick, quacking excitedly all the time. I never saw a finer exhibition of parental devotion than was shown by her total disregard of her own safety, which did not cease until we left the locality" (1902, p. 5).

These notable ducks, which Mr. Job well characterizes as greyhounds among waterfowl for their speed and grace and elegance, easily become reconciled to the presence of man. A nest found by Mr. Rockwell was only eighteen feet from the rails of the main line of the Burlington Railroad over which a dozen or more heavy trains thundered every day, and well within the railroad right-of-way where section hands and pedestrians passed back and forth continually. So easily tamed are they that Mr. Job predicts that in time domesticated Pintails will be as familiar as domesticated Mallards on preserves and private estates. Great flocks of them gather with other ducks at the celebrated municipal feeding grounds of Lake Merritt in Oakland, California, where an average of \$500 a year is spent for grain for them by the Oakland Park Board. At 10 a. m. and at 4 p. m., when a man appears with a bag of barley over his back, they fly out of the water and crowd up on the lawns

in spite of the encircling crowds of spectators and automobiles. Not only food but clean fresh drinking water is provided, and as Mr. Dixon says, in his "Lesson in Civic Ornithology," they are assured of sanctuary and suitable loafing grounds (1927b, 329-334).

In the marshes of Louisiana Mr. Job has found the Pintails nesting by thousands, their numbers having greatly increased since the stopping of spring shooting, which he justly denominates an "outrage against reason and conservation, now made an offense by Federal Law and by an International Treaty."

The longevity of wild birds is a subject about which so little is known that the records given by Mr. F. C. Lincoln in the Condor, obtained from a banded Pintail, are of peculiar interest. "On September 16, 1914, Dr. Alexander Wetmore banded an adult male Pintail . . . at the mouth of Bear River, Utah, using Biological Survey band no. 519. This bird had been suffering from the duck sickness (alkali poisoning) and had been successfully treated and brought to complete recovery by Doctor Wetmore. It was killed on October 16 or 17, 1926, ten miles north of Brawley, California, by Mr. H. W. Seybert." So the band was carried for over twelve years; as Mr. Lincoln says, "a most remarkable record, in view of the fact that each season it had run the gauntlet of hunters and also had escaped the poisonous alkali areas and other natural enemies" (1927a, p. 115). As the duck was adult when banded, it was at least thirteen years old when killed. Records from banded game birds found in New Mexico will of course be reported by sportsmen or whoever discovers them.

ADDITIONAL LITERATURE.—BENT, A. C., Auk., XIX, 4-7, 1902; U. S. Nat. Mus. Bull. 126, 144-156, 1923.—BRYANT, H. C., Condor, XVI, 220-223, 1914.—DIXON, J. S., Nat. Geographic Magazine, vol. 39, 332-336, 1919; Bird-Lore, 329-334, 1927 (being fed at Lake Merritt).—JOB, H. K., Educational Leaflet 76, Nat. Assoc. Audubon Soc.—KIBBE, A. S., Condor, XXVII, 55-58, 173-174, 1925 (Lake Merritt, Oakland).—LINCOLN, F. C., Condor, XXVI, 88-90, 1924 (banding and migration).—ROCKWELL, R. B., Condor, XIII, 186-189, 1911.

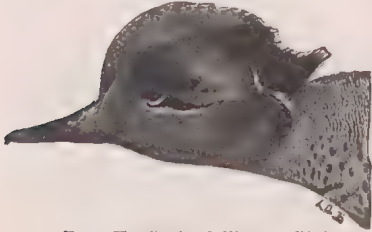
GREEN-WINGED TEAL: *Néttion carolinense* (Gmelin)

DESCRIPTION.—*Length*: 12.5-15 inches, wing 6.2-7.4, bill 1.4-1.6, tarsus 1.2. *Weight*: Early in season $\frac{3}{4}$ lb.; wintering specimens to $\frac{5}{8}$ lb. (Leopold). *Adult male in breeding plumage*:¹ Head brown, with metallic, bright green patch from eye back to short crest; fore upperparts crossbarred, posterior upperparts, including tail, dark brown; wing with bright green speculum (violet at certain angles), bordered by buffy brown and black; outer scapulars widely edged with black, making black streaks; higher underparts finely crossbarred with black and white, breast pinkish brown, spotted with black and generally with white bar near bend of wing; belly white, under tail coverts black contrasting with creamy white patch each side of base of tail; iris brown, bill black, legs and toes grayish, webs blackish. *Adult male in post nuptial eclipse*: Similar to female but variable, head without green or brown,

¹ Mr. Aldo Leopold reports that near Albuquerque the adult male plumage (whether from the immature or the eclipse or both is not known) is acquired November 15-December 1.

body without buffy. *Adult female*: Upperparts dark brown, feathers of back and scapulars edged with buff, ashy or whitish; breast, sides, and flanks similar but of lighter tone, and under tail coverts still lighter; *wing nearly like male* but wing bar before speculum sometimes white; iris, bill, legs and feet much as in male.

Young in juvenal plumage: Similar to female but tail feathers more blunt at tips.



From Handbook of Western Birds

FIG. 11. Green-winged Teal

COMPARISONS.—This is the smallest of our ducks. In any plumage lack of chalky blue on the wings distinguishes it from the Blue-winged and Cinnamon Teal, and lack of white on the wings from the small Bufflehead (Taverner). (See pp. 124, 126, 141.)

RANGE.—Breeds in northern North America, practically across the continent but sparingly in the east; from northwestern Alaska, northwestern Mackenzie,

Great Slave Lake, Hudson Bay, and Labrador south to southeastern Canada, Illinois, Minnesota, Nebraska, northern New Mexico, northwestern Utah, northwestern Nevada, and south-central California; winters from southeastern Alaska, British Columbia, Montana, Nebraska, the Great Lakes and eastward south to Bahamas and Lesser Antilles, British Honduras, and southern Lower California.

STATE RECORDS.—Breeding not rarely in southern Colorado it was to be expected that the Green-winged Teal would nest also in New Mexico and this it undoubtedly does more often than the single positive and definite breeding record would indicate; Mitchell says that it breeds in eastern San Miguel County, but he gives no definite locality. [At Lake Burford, in June, 1918, about five pairs were apparently breeding and a few males which had presumably nested elsewhere, appeared June 14, 1918 (Wetmore). It is found on the mountain lakes in Colfax County (Charles Springer, 1925).]

In migration it is one of the more common ducks throughout the lower parts of the State and even up to 9,000 feet in the Chuska Mountains (Bailey). In the fall migration it was already abundant at Beaver Lake, 7,500 feet, by August 26, 1908 (Birdseye); and on August 28, 1845, was found common near the headwaters of the Canadian River (Abert). Flocks were seen on the Maxwell reservoir near Koehler Junction off and on from August 19 to October 24, 1913 (Kalmbach). It remains common through September. It was noted in Dry Diamond Canyon, Black Range, September 13, 1915; [many were seen between Albuquerque and Socorro, September 4, 1918 (Ligon)]; and it was one of the most abundant ducks on Lake Burford September 27–October 3, 1904 (Bailey). Most of the flocks depart during October; but it was noted as late as October 20, 1898, at Roswell (Barber), and was still present October 26–31, 1908, at San Rafael. About 20 were seen and one collected at Clayton, October 23, 1893 (Seton). [Near Albuquerque the main flight disappeared about November 10, in 1917 and 1918 (Leopold).] Formerly it wintered abundantly on the Mimbres and the lower Rio Grande (Henry), and even at the present time a few winter in the State north to Bear Canyon east of the San Andres Mountains, where they were noted in January, 1903 (Gaut), [to San Acacia south of Belen (Leopold, 1919)], and to Rinconada, where some wintered 1903–1904 (Surber). On the Carlsbad Bird Reserve, they were noted February, 1914 (Wilder; noted January, 1915, and the winter of 1915–16 (600 seen, December, 1916; also on the Rio Grande Bird Reserve (Elephant Butte) found common, November 23–December 9, 1916 (Willett); and 12 seen 24 miles northeast of Engle, December 8, 1918, at a windmill tank at about 4,700 feet (Ligon).]

In the spring migration it is most common in March, arriving at Camp Burgwyn, March 16, 1860 (Anderson), proceeding northward in early April. On the Carlsbad Bird Reserve in 1914 it was noted on March 6; 200 were estimated March 13, and several hundred, March 23, 24, and 25; also on the Rio Grande near Albuquerque, 100 were reported, March 21, 1914 (Cooper). On the Mayberry Ranch about 60 miles west of Magdalena, perhaps 25 were found April 26, 1915 (Ligon).—W. W. COOKE.

NEST.—On the ground near water in thick grass, or among willows, made of grass and lined with down. *Eggs*: 6 to 12, pale buffy white or greenish buff.

FOOD.—Mainly seeds of aquatic plants including various grasses, sedges, wild rice, wild millet, wapato, and pondweeds, duckweeds, small acorns, fallen grapes or berries, aquatic insects, alkali flies, brine shrimps, and small snails. The gizzards of two taken at Lake Burford September 27, 1904, were full of small seeds, mainly salt weed (*Dondia*).

GENERAL HABITS.—One of the little brown-headed Green-wing drakes shot near Cebolla Spring, September 28, 1906, was in exquisitely fresh fall plumage with a delicate green bloom on the wing coverts and beautiful rose bloom on parts of the back, wings, and tail. When seen with the big Mallard feeding in the shallows, as it often is, the Green-wing looks surprisingly diminutive, and it is easy to understand its preference for the quiet harbors of fresh-water marshes and small waterways. Near Las Vegas in December, 1882, Mr. C. F. Batchelder found that the small Ducks "adapted themselves easily to circumstances in this scantily watered country. Their favorite resort was an irrigation ditch that followed the course of the river some distance below where it emerges from the canyon. This ditch was not more than six feet wide, but the water was clear and had a swift current. The banks were thickly lined with slender low willows that overhung the water, offering an excellent shelter that the Teal seemed to appreciate highly. They were also sometimes to be found along the river, on some of its stiller stretches that were thickly fringed with bushes" (1885, p. 238). When in North Dakota wading in rushes bordering a small pond, Mr. Job says, "I heard some pattering sounds, and from almost at my feet eight tiny ducklings followed one another in a line out into the open water. In a moment the mother was on hand, and flapped and dragged herself about, almost within arm's reach of me. The young swam into the rushes again, and the old bird kept up the performance as long as I stayed there, flying off and coming back to renew her protestations (1899, p. 163).

The duck has a high pitched, small *quack*, *ka-ack*, *quack*, but the drake's soft whistle, suggesting the note of the Wood Duck, seems quite in character with the delicate, exquisitely marked bird.

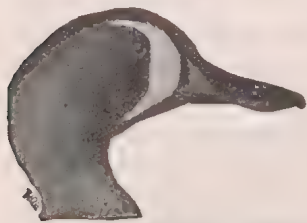
The Green-wing is a rapid swimmer but seldom dives. On the wing the little duck shows surprising power, as was instanced by one Mr. Bailey saw trying to escape from a Golden Eagle. The Eagle gave chase

when the Green-wing was in the air heading down for a pond and as long as they descended, the great bird rapidly gained on it; but when the pond was passed and the small duck, finding itself obliged to go farther, began to rise, the heavy Eagle was quickly outdistanced.

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 126, 102-111, 1923.—BERGTOLD, W. H., Auk, XLV, 170-176, 1928 (numbers of ducks).

BLUE-WINGED TEAL: *Querquedula discors* (Linnaeus)

DESCRIPTION.—*Length:* 14.5-16 inches, wing 7-7.5, bill 1.4-1.6, tarsus 1.2-1.3. *Adult male in winter and breeding plumage:* Head and neck dull lead color becoming black on top of head and with *white crescent before eye*; upperparts dark brown, feathers marked with buff or rusty; *wing with large bluish patch* adjoining green speculum framed in white, axillars and most of *wing linings* and a *spot on each side of base of tail, white*; underparts reddish brown, spotted with black; under tail coverts blackish; iris brown, bill bluish black, legs and toes dull yellow, or



From Handbook of Western Birds (Fuertes)

FIG. 12. Blue-winged Teal

yellow-orange, with dark webs. *Adult male in post-nuptial eclipse:* Similar to female but head with trace of white crescent, wing much as in winter male. *Adult female in winter and breeding plumage:* Upperparts dark brown, feathers with dull buffy edgings, eye streak dusky, sides of head and neck *heavily speckled*; wing much as in male but colors restricted and speculum duller; *chin and throat white*; rest of underparts spotted with grayish brown, *without rusty*. *Young in juvenal plumage:* Similar to adult female but belly often plain white, speculum grayish brown without gloss; feet pale or flesh-tinted (Coues).

RANGE.—Breeds mainly in central North America, more rarely toward the east and west coasts, from central British Columbia, Great Slave Lake, Manitoba, Ontario, and probably Quebec south to Maine, Indiana, Kansas, New Mexico, central Utah, northern Nevada, and central Oregon; winters from southern California, Arizona, southern Illinois, and Delaware south to West Indies, Brazil, and Chile.

STATE RECORDS.—The Blue-winged Teal has more records in New Mexico than any other species of duck. [Mr. Ligon in 1916 stated that it was the most common duck, except perhaps the Mallard, nesting at suitable places all over the State.] Possibly 25 birds were found 60 miles west of Magdalena, April 26, 1915, where they were said to nest (Ligon). It was noted June 24, 1855, at Pope Well near the Pecos in extreme southern New Mexico (Pope); [several pairs and one nest of 10 fresh eggs were found May 9, 1920, at San Simon Marshes (Ligon)]; a pair June 20, 1903, near Mesa Rica, and several pairs on the ponds near Santa Rosa June 2, 1903 (Bailey). Some or all of these were undoubtedly breeding and they constitute some of the most southern localities in the United States at which the species has been found in the summer. A few breed near Mesilla (Merrill), and it is a common breeder at Lake Burford where it had half grown young July 20, 1913. [Great numbers of young were found there in July, 1916 (Ligon), but in 1918, when apparently the numbers of ducks were greatly depleted, only four pairs were found breeding on the lake (Wetmore).] On a neighboring small lake, Clear Lake, it was the most abundant species of duck. At Dulce Lake, 6,700 feet, several old ones with young not more than a third grown were noted August 7, 1913, and young were still common at Clear Lake August 10 (Ligon). Many were seen September 9, 1903, at Black Lake, 8,400 feet, both old and full grown young; and some of these may have

nested on the small tule-covered islands in the lake (Bailey). Near Koehler Junction, while not so abundant as the Green-wing, they were seen on numerous occasions between July 28 and October 24, 1913 (Kalmbach). [On the Rio Grande Gun Club lakes, 6 miles southwest of Albuquerque, they were seen June 16, 1919 (Ligon).]

During migration it is common up to 8,400 feet on the top of the Chuska Mountains, and one was seen August 23, 1904, on the Costilla River at an altitude of 9,400 feet (Bailey). It is among the earlier migrating ducks and usually few flocks remain in the State after early October; [near Albuquerque it was common October 15–November 1 in 1917, though none were seen in 1918 (Leopold)]; one was noted October 20, 1898, at Roswell (Barber); three were taken near Tularosa November 6, 1902 (Gaut); and several remained the first three weeks of November, 1908, near Blanco in extreme northern New Mexico (Birdseye).

Fifty years ago the species was reported as wintering on the Mimbres (Henry). In the Las Cruces region of the Rio Grande "a rather large number remain over winter in secluded places" (Merrill). On the Carlsbad Bird Reserve it was noted February, 1914 (Wilder); reported as seen occasionally in January, 1915; noted in the winter of 1915–16; [600 estimated December, 1916; also, on the Rio Grande Bird Reserve (Elephant Butte), noted November 23–December 9, 1916 (Willett).]

This is one of the latest ducks to move northward in spring migration; comparatively few appear in the State before the middle of April, and it is late in May before the last of the migrants have departed—May 25, 1890, at Carlisle (Barrell). One was taken May 11, 1900, at Willis (Birtwell).—W. W. COOKE.

NEST.—Generally on dry ground in thick grass either close by or far from water, but sometimes among reeds or cat-tails, or in cavities on muskrat houses; made variously and crudely or skillfully of bits of soft grasses, reeds, or cat-tail blades, lined with cream colored down. *Eggs:* 6 to 12, pale olive-buff or creamy buff.

FOOD.—Mainly vegetable matter, as the seeds, roots, and tender blades of water plants, grasses, pondweeds, duck weeds, wild millet, wapato, and especially wild rice; but also snails, tadpoles, and many insects, including grasshoppers and locusts.

GENERAL HABITS.—If seen at a distance, lying resting on a lake shore, the little Blue-wing drake may be taken for a block of wood, his white face crescent and the white spot at the base of the tail serving to hold the eye, to the loss of the duck form.

Only a size larger than the Green-wing, the Blue-wing also is fond of quiet water ways, being the characteristic Teal of the prairie lakes and sloughs. When occurring together, as they do on the prairies, it is said that the Blue-wings, Green-wings, Mallards, Shovellers and Canvas-backs often lay their eggs in one another's nests.

On the edge of a flooded meadow early in summer a small band may suddenly light before your astonished eyes and begin nodding and bowing to one another in absorbed courtship play. Later in the season, in some quiet secluded spot, perhaps a tree-encircled grassy marsh, as a Bittern stealthily vanishes, a pair of the little ducks may rise from your feet and go swerving off to cover.

And again, as you drive along an overgrown road by a remote lake shore, a small brown duck may burst away from before the horses, and though you hurry to examine the nest with its little brown eggs barely missed by the horses' feet and the wagon wheels, almost before you can

start on, back will come the anxious mother circling down to her uncovered nest. Sometimes in flight the Blue-wing gives a soft thin *seep-seep-seep*. Rapid travelers these small ducks are. Late in summer one may see large flocks passing over with blue-patched, whistling wings and free, tilting flight.

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 126, 111-121, 1923.—ROCKWELL, R. B., Condor, XIII, 124-128, 1911.

CINNAMON TEAL: *Querquedula cyanoptera* (Vieillot)

DESCRIPTION.—*Length:* About 15.5-17 inches, wing 7.2, bill 1.6-1.8, tarsus, 1.2-1.3. *Adult male in breeding plumage:* Crown and chin black, rest of head, neck, and underparts cinnamon-brown; fore back brownish black with U-shaped bars and edgings of chestnut; lower back and rump greenish brown, feathers edged with paler; upper tail coverts and tail brown or black; *wing with large light blue patch in front of white bar and metallic green or blackish speculum;* axillars white, wing linings, white and dull brown; under tail coverts black; iris orange, bill black, under mandible tinged with pink, legs and feet greenish orange. *Adult male in post-nuptial eclipse:* "Resembles the female in general but is somewhat brighter in color" (Wetmore). *Adult female:* Like the female Blue-wing but head and chin more speckled, and with cinnamon-brown and U-shaped markings on breast; iris brown, legs and feet greenish. *Young in juvenal plumage:* Similar to adult female but streaked below.



From Handbook of Western Birds

FIG. 13. Cinnamon Teal

COMPARISONS.—Records of female Cinnamon Teal should be made with great caution as they are difficult to distinguish from the Blue-winged in life. The common rust staining of the Blue or even the Green-winged has often been the basis of records of the Cinnamon Teal (Taverner). (See pp. 121-122, 124.)

RANGE.—In North America breeds from southern British Columbia, Alberta, Saskatchewan, and western Montana south to southwestern Texas, New Mexico, northern Mexico (Chihuahua), and northern Lower California; winters from central California, southern Arizona, central New Mexico and probably southwestern Texas south to central Mexico and southern Lower California. In South America breeds from Peru and Argentina south to Falkland Islands; winters from Peru, Bolivia, and southern Brazil south to central Patagonia and southern Chile.

STATE RECORDS.—The Cinnamon Teal breed abundantly in Colorado, and have been recorded from a number of localities in New Mexico, though Ligon has not found them abundant anywhere in the State. They were reported common in summer on the Mimbres River and the Rio Grande (Henry), and breed south of New Mexico at Saux, Chihuahua (Bangs). On the Patterson Ranch lake, about 75 miles west of Magdalena, Ligon was told by Grover Mayberry that they always raise young, and in May, 1915, he found them rather common there. On the Mayberry Ranch, 60 miles west of Magdalena, April 26, 1915, he found many and was told that they nested. [At Lake Burford in May, 1918, it was estimated that 12 pairs were nesting. After May 27, single males were fairly common, as the resident birds were just beginning to lay (Wetmore). They were observed rather

commonly over the western central portion of the State (1916-1918), and on June 16, 1919, several were seen on the Rio Grande Gun Club lake southwest of Albuquerque; on May 3, 1920, 12 pairs were found at lakes 4 miles north of Albuquerque (Ligon). On May 11, 1924, a male and female were seen near the Rio Grande south of the San Juan Pueblo (Jensen). They are also found on mountain lakes in Colfax County (Charles Springer, 1925).]

They are common in New Mexico during migration and have been noted at 3,000 feet at Carlsbad (Bailey); 4,800 feet, both Albuquerque (Woodhouse), and on the salt flats west of the Sacramentos (Hollister); 6,000 feet, Silver City (Hunn); 7,000 feet, Fort Wingate (Shufeldt); 8,000 feet, Halls Peak (Barber). Early fall migrants were noted in the Animas Valley, August 9, 1908 (Goldman), and most of the species pass through the State in September.

It is not probable that any winter in New Mexico, and regular spring migration does not begin usually until late in March—on March 30, 1901, one was taken at Albuquerque (Birtwell). [At Silver City they are fairly abundant late spring migrants (Kellogg, 1927).]—W. W. COOKE.

NEST.—Often on small islands or banks of ponds in sedge or salt grass, compactly made of grass lined with more or less dusky down. Eggs: 6 to 12, creamy white or pale buff.

FOOD.—Seeds of aquatic plants, as pondweeds, scirpus, ruppia, and also water beetles, weevils, and dragon flies, snails, and bivalves. The stomach of one taken September 28, 1904, at Burford Lake, was full of small seeds, mainly *Dondia* from the flooded bottoms (Bailey).]

GENERAL HABITS.—The names Red-breasted Teal and South American Teal are both descriptive as the Cinnamon is of South American origin, having spread over the Western United States. A clue to the significance of its coloration is given by Doctor Henry, who found it on the Mimbres and the Rio Grande in the early days. Usually found among the sedge that borders sloughs near a watercourse, he says, "its plumage, so closely resembling the reddish brown of the withered sedge of last year's growth, renders it observed with difficulty, thus carrying out that admirable rule in nature's handiwork that so generally prevails, viz., assimilation of the plumage of birds to the color of the haunts they affect" (1885, p. 316). When not wanting to call attention to himself or when merely thinking of the one ear he wishes to reach, the male Cinnamon uses what Doctor Wetmore characterizes as a "low, rattling chattering note that can be heard for only a short distance."

During their courtship, Mr. H. C. Bryant once saw two combatants that were swimming on the water "face each other about a foot apart, and make lunges at each other, using both bill and wings as weapons. Occasionally one of the birds would avoid attack by diving, allowing the other to jump completely over him" (1914, p. 223). At Lake Burford when some single males came in after the others were paired, Doctor Wetmore says they "persisted in paying attention to females already mated, much to the disgust of the paired drakes, who drove them away, bowing and chattering angrily. On one occasion six were seen making demonstrations toward one female who paid no attention to them but

followed her mate. He swam first at one and then another, after each chase returning to his mate and bowing rapidly, while occasionally she bowed to him in return" (1920a, p. 242).

On an alkaline lake in southern California, we once found Cinnamon Teals feeding with the Mallards and Gadwalls, looking very small by comparison. They were surprisingly tame, coming up as I noted, "within a few yards of us, looking up at us curiously as we talked to them." And near the lake shore a brooding duck was flushed from her nest—a hollow in the ground encircled by dusky down from her breast—both nest and eggs being almost entirely hidden by the high soft yellow grass. At our second visit we found that "the yellow grass had been combed up and drawn in at the top with cunning art to conceal its enclosed treasures. Walking up softly and speaking in low tones we were able to get so near that we could see the eye of the brooding bird as well as the fine brown pencilling of her head and breast, and the blue speculum of her wing." At our third visit, under the edge of one wing "we discovered a protruding patch of yellow down. Misinterpreting our excited comments, after a courageous stand she burst away from almost under our hands, coming down in the grass a few yards away, waddling along dragging her wings in appealing decoy. Turning our backs we hurried guiltily down the beach. When we ventured to look back she was swimming around on the lake, picking about with apparent indifference; but even as we watched over our shoulders, back she swam, straight for the shore. How fast she went! When nearly there she stopped and took one last look at us, then quickly climbed up the bank and across the beach to the nest" (1917b, pp. 158-159).

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 126, 122-130, 1923.—BRYANT, H. C., Condor, XVI, 222-223, 1914.—ROCKWELL, R. B., Condor, XI, 112, 1909; XIII, 128, 1911.

SHOVELLER: *Spátula clypeáta* (Linnaeus)

DESCRIPTION.—*Length*: 17-21 inches, wing 9-10, bill 2.6-2.9, width of bill at end 1.1-1.2, at base .6, tarsus 1.4-1.5. *Weight*: 1 lb. to 1½ lbs. (Leopold). *Bill widened and rounded at end*; laminae numerous and protrusive. *Adult male in winter and breeding plumage*: Head metallic green (black in a poor light); medium upperparts slaty bordered widely with white of scapulars; rump, and upper tail coverts black, tail feathers brown, conspicuously edged with white; wing with blue patch, white bar, and green speculum; axillars and wing linings mostly white; belly maroon between two white arcs—white of breast and white patches under base of tail—iris yellow or orange, bill blackish, legs and feet orange-red. *Adult male in eclipse plumage*: Without green, white, or maroon; plumage similar to female; brown, coarsely marked with dusky (Millais). *Intermediate plumage*: Head dark but not metallic, white of breast obscured by transverse bars. *Adult female*: Head and upperparts brown, feathers edged with ashy or buffy and those of back irregularly barred; wing like male but duller, speculum with less green, and with two white bars; breast spotted, belly usually more or less rusty; tail edged with

white or whitish; iris brown, bill with upper mandible greenish, lower mandible edged with orange, legs and feet orange, paler than in male. *Young*: The immature male is intermediate between the adult male and female, the breast usually tinged with chestnut. The immature female resembles the adult female, but the wing coverts are slaty gray instead of blue, the speculum dusky, with little or no green (Chapman).

RANGE.—Temperate regions in the Northern Hemisphere and northern parts of Southern Hemisphere. In North America breeds from northwestern Alaska, mouth of the Mackenzie, central Alberta, and eastern Manitoba south to Indiana, Kansas, northern Texas, southern New Mexico, central Arizona, and southern California; winters from southern British Columbia, Arizona, New Mexico, southern Texas, Illinois, and east to Virginia south to Antilles, Colombia, and in Hawaii.

STATE RECORDS.—The breeding range of the Shoveller extends from the Arctic south to southern California, southern New Mexico, and central Kansas. ["Rather common over the State, nesting in the Pecos Valley near Roswell"—May 27–June 22, 1924; on lakes east of Dexter, at the White Lakes and others northeast of Roswell—four pairs seen May 3, 1920, at a lake four miles north of Albuquerque, also old birds with young at Lake Burford in July, 1916 (Ligon). At Lake Burford in May, 1918, 15 pairs apparently breeding, and May 27 on Hayden Lake, near by, about 40 pairs, apparently migrants, were seen (Wetmore). At Silver City they are abundant in spring and fall (Kellogg, 1927);] noted in spring on the Mimbres (Henry).

In the fall migration, they have been seen September 28, 1904, at Lake Burford, (Bailey); October 5, 1900, at Albuquerque (Birtwell); several large flocks near Koehler Junction, Colfax County, October 19–24, 1913 (Kalmbach); a flock of less than a dozen seen at Clayton, October 23, 1893 (Seton); [common in October, 1917 and 1918 (Leopold)]; seen October 25, 1909, at Las Palomas (Goldman); November, 1905, at Turrieta Lake in the San Francisco Mountains near Joseph (Andrus); and as late as December 1, 1855, at Dona Ana (Pope).

In winter on the Carlsbad Reserve it was noted February 18, 1914 (Wilder); was reported in January, 1915, and observed in the winter of 1915–16; [100 were noted November 23 to December 9, 1916, and 500 noted in December, 1916 (Willett). A few wintered as far north as San Acadia in 1918 (Leopold).]

In the spring early migrants were noted at Halls Peak, March 16, 1895 (Barber); near Albuquerque noted in spring (Woodhouse). On the Mayberry Ranch, 60 miles west of Magdalena, several were seen April 26, 1915 (Ligon). Several flocks were seen near Santa Rosa, May 20 to June 2, 1903 (Bailey), but the fact that the birds were in flocks rather than pairs would indicate that these were late migrants.—W. W. COOKE.

NEST.—A depression in the ground, often far from water in dry grass or under bushes, or in moist meadowland; lined with grasses or weeds and down (brownish with whitish centers). *Eggs*: 6 to 14, pale olive-buff to greenish gray, like those of Mallards and Pintails but smaller.

FOOD.—Seeds, tender shoots, and rootlets of aquatic plants, grasses, algae, onion bulbs; larvae and pupae of alkali flies; various enemies of fish, as dragon-fly nymphs, giant water bugs, water scorpions, and crawfish; earth worms, locusts, grasshoppers, and other insects, caddice-fly larvae, leeches, tadpoles, brine shrimps, and mollusks.

GENERAL HABITS.—The Shoveller, Shovel-bill, Broad-bill, or Spoon-bill can be recognized in any of its various plumages by its wide mouthy bill, much wider near tip than base, with highly developed "comb-like

fringes along the edges of the upper mandible for skimming the surface and straining out minute plants and animals." Of all the ducks, as Mr. Bent says, it is most essentially a surface feeder, and frequents marshes, shallows, and flooded lands. When not skimming the surface, it puts its head under water and if the water is not too shallow, stands on its head with tail in air. The brown female shows very little as she swims low through the flooded meadows, but, when preening, the yellow under mandible shows and when she stretches her wing with her orange foot it can be seen across the water. This is one of the few ducks, Mr. Aldo Leopold finds, which does not avoid "dead" sloughs—those containing stagnant alkali water.

Where the Shovellers nest commonly, as on the prairie sloughs of North Dakota, a drake appearing uninvited on a neighboring slough is sometimes given a sharp lesson; but at other times the rivalry of the drakes takes a milder form. Once when I had been watching a pair swimming around on a slough, "a second drake, showing his blackish head, white breast, and dark maroon belly, flew over and lit on the water with bill tilted up airily, and at once started across the slough after drake No. 1, clucking and raising and lowering his neck, his bill held slightly above the horizontal. No. 1 promptly swam out and met him half way, whereupon both did head exercises. Once when performing the two stood facing each other only a yard or so apart, raising and lowering their heads."

Another time when a pair of Shovellers had been enjoying themselves, bathing, feeding, and "paddling around close together in a pretty confidential, conjugal way for some time, a brown sister flew in. At this the duck quickly swam out toward the visitor, as if with friendly greeting, and the drake stretched up till he looked very long necked and gave several jerky bows of the head, after which he loyally swam off to his mate. The visitor, left alone, swam off by herself" (1918, pp. 31-32).

ADDITIONAL LITERATURE.—BENT, A. C., *Auk*, XIX, 3-4, 6, 1902; U. S. Nat. Mus. Bull. 126, 135-143, 1923.—MCATEE, W. L., *Auk*, XXXIX, 380-386, 1922 (food).—PEARSON, T. G., Educational Leaflet 84, Nat. Assoc. Audubon Soc.

WOOD DUCK: *Aix sponsa* (Linnaeus)

DESCRIPTION.—*Male: Length:* About 19-20.50 inches, wing 9-9.50, bill 1.4. *Female: Length:* About 17-19.5 inches. *Adult male in breeding plumage:* Crest long and drooping, rich purple and green, streaked with white; throat and prongs on cheeks and hind neck, white; back iridescent greenish brown, tail long and dark with bronzy green reflections; speculum purplish steel blue; chest mahogany, spotted with white, bordered by a white bar edged with black before bend of wing; sides pale buffy; rest of underparts white except patch of metallic purplish on each side at base of tail; iris, eyelids, and base of bill red; legs and toes dull yellow, webs dusky.

*Adult male in eclipse plumage:*¹ Head without elongated crest but with white markings on sides, upperparts dull browns and greens but with metallic colors, breast and sides streaked with brown; eyes, bill, and feet with colors somewhat dulled. *Adult female:* Upperparts grayish brown; throat, line around base of bill, and *elongated eye patch white*; upper tail coverts and tail glossed with greenish; breast and sides brown streaked with white, *belly white*, iris, brown, eyelids yellow, bill lead color, legs and feet yellowish brown. *Young in juvenal plumage:* Similar to female but underparts mottled.

RANGE.—Breeds locally in the United States and southern Canada entirely across the continent, from southern British Columbia, northwestern Montana, and southern parts of Montana and Ontario south to Cuba, Florida, south-central Texas, southwestern Colorado (very rare but probably Nevada and Utah), central California; winters (chiefly in United States) from southern British Columbia, Kansas, Illinois, east to Connecticut and south to Gulf of Mexico, central Mexico, and southern California.

STATE RECORDS.—Though ranging in summer over most of the United States, the Wood Duck is absent as a breeder from the whole Rocky Mountain region south of Idaho. Non-breeding individuals have been noted occasionally in Wyoming and Colorado and a single bird was seen July 2, 1887, at Amarillo (Evermann and Jenkins). Henry says of the Wood Duck that even in his day, 50 years ago, when ducks were much more abundant than at present, "but two or three were ever met with, and only on the Rio Mimbres." One was noted October 12, 1846, near Las Palomas (Emory).—W. W. COOKE.

HABITAT.—This remarkably beautiful duck, with its richly varied colors, the duck that Mr. Henshaw rightly denominates "one of the most perfect of nature's creations," is a rare bird of woodland pools whose few New Mexico records may well be cherished.

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 126, 158-171, 1923.—BREWSTER, WILLIAM, Bull. Mus. Comp. Zool., Harvard, LXVI, 125-136, 1924.—DIXON, J. S., Condor, XXVI, 41-66, 1924.—FISHER, A. K., Reprint Year-book Dept. Agr. for 1901.—PEARSON, T. G., Educational Leaflet 7, Nat. Assoc. Audubon Soc.—THAYER, G. H., Concealing-Coloration in the Animal Kingdom, 62, 63, 66-71, 130, 1909.

SEA DUCKS: Subfamily Fuligulinae

While the River Ducks are characteristically birds of the marshes and other shallow waters, the Sea Ducks are open-water birds frequenting large lakes, bays, and sea coasts. They are expert divers, often getting their food, which consists mainly of mollusks and aquatic animals, in water from seventy-five to a hundred and fifty feet in depth. Their anatomy explains their habits, for their feet are larger with broader webs, the *hind toe is lobed*, and the legs are shortened and set farther back than in the River Ducks, so that while on land they "waddle" more than the River Ducks, "their swimming powers are enhanced and diving is facilitated" (Coues). "Their plumage is very dense and less inclined to bright colors in the drakes, or mottling in the

¹ Chapman, F. M., Handbook of Birds of Eastern North America, Plate V, p. 86, 1912.

ducks; but a pied pattern in light and dark areas is more prevalent . . . highly gregarious in habit they often flock by hundreds of thousands over their favorite feeding grounds" (Eaton).

REFERENCE.—MILLAIS, J. G., British Diving Ducks, 1913.

REDHEAD: *Nyroca americana* (Eyton)

DESCRIPTION.—*Length:* 17–21 inches, wing 8.5–9.2, bill 2–2.2, greatest width of bill .7–.8. *Weight:* 1½ to 1⅞ lbs. (Leopold). *Head* puffy, bill medium. *Adult male in winter and breeding plumage:* Head reddish, neck and foreparts of body black; back and forepart of wings gray from black and white vermiculations, posterior part



From Biological Survey

FIG. 14. Redheads
Sailing down to water

of wings contrastingly lighter gray; speculum bluish gray bordered by white, axillars pure white, wing linings gray; upper and lower tail coverts black; belly white; iris yellow, bill bluish gray with black tip; legs and toes grayish, webs blackish. *Adult male in post-nuptial eclipse* (a partial eclipse): Head dull brownish red, back showing brown, breast and underparts mottled. *Adult female in winter and breeding plumage:* Upperparts and breast dark grayish brown, grayish buff or whitish around base of bill and lores; upper tail coverts brown, tip of tail whitish; wing like male; chin and belly white. *Young in juvenal plumage:* Similar to adult female but more mottled.

COMPARISONS.—The Redhead and Canvasback are sometimes confused, but the high forehead and low, medium bill of the Redhead can easily be distinguished from the low flattish forehead and high, long slanting bill of the Canvasback. The female Redhead may be distinguished from the female Mallard and Gadwall by her unmottled, "uniform brown color," from the Golden-eye by absence of whitewing patch, and from the female Scaup by absence of clear white face mark or white wing stripe (See pp. 134, 110, 115, 139).

RANGE.—Breeds from central British Columbia, Great Slave Lake, central Saskatchewan, and southern Manitoba, Minnesota, and Michigan south to Nebraska, southern Colorado, southwestern Utah, northern New Mexico, central Nevada, and southern California; winters (mainly in the southern United States) from southern British Columbia, southeastern Arizona, northern Arkansas, northeastern Colorado, Lakes Erie and Ontario, east to Atlantic and south to Florida, Bahamas, Cuba, West Indies, and central Mexico.

STATE RECORDS.—Until recently it was supposed that the Redhead did not nest anywhere in the Rocky Mountain region of the United States. The past few years some pairs have begun to nest at Barr Lake near Denver, Colorado, and also probably in the San Luis Valley of southern Colorado. They were fairly common on the

Burford lakes when visited the last of September, 1904, and since when shot at they repeatedly refused to fly, diving and swimming away perhaps, but not taking wing, it looked as if they had bred there, and that the young and molting birds were not in condition to fly (Bailey). Nine years later when these lakes were visited by Ligon in the breeding season he found them the commonest of the larger ducks both on the Burford Lakes and on Clear Lake. A nest with eggs was found July 18, 1913, and an old bird accompanied by newly hatched young, July 21. [At Lake Burford in 1918, 30 pairs were located and a nest with 14 eggs was found June 13; four single males were seen June 6, and a flock of 12, June 8; after which they were common (Wetmore). They are found on mountain lakes in Colfax County (Charles Springer, 1925).]

Fall migrants appeared on Beaver Lake August 26-27, 1908 (Birdseye), and the species has been noted as late as October 26, 1908, at San Rafael (Bailey), to November 17, 1909, at Garfield (Goldman); one collected from a small flock on a prairie pond at Clapham, October 26, 1893 (Seton), [near Albuquerque not common but generally seen about November 25 (Leopold, 1919)].

In winter they have been noted on the Carlsbad Bird Reserve, February, 1914 (Wilder), January, 1915, winter of 1915-16, [December, 1916; also on the Rio Grande Bird Reserve (Elephant Butte), noted November 23-December 9, 1916 (Willett)].

Spring migration begins in March and by the last day of the month in 1902 the species had passed north to Las Vegas (Atkins). [At Silver City it is fairly abundant both spring and fall. One was taken March 10, 1919 (Kellogg). Since 1916, during each migrating season, they have been seen in the high lakes on the tributaries of the East Gila River (Ligon).]—W. W. COOKE.

NEST.—Over shallow water in reeds or cat-tails, on old muskrat houses, or on marshy or grassy ground near water; usually deep, well made of aquatic plant stems, grasses, reeds, or cat-tail, lined with *white* down. *Eggs*: Usually 10 to 15, light olive-buff to cream-buff, like the Mallard's but larger.

FOOD.—Wild rice, wild celery, pondweed, and other aquatic plants; acorns, beechnuts, and also insects, leeches, tadpoles, frogs, snails, fresh water clams, lizards, and small fish. Of two taken at Lake Burford September 28, 1904, from the deep part of the lake where pondweed grew under the surface, the stomach of one was filled with seeds of juncus and sedge with a few green stems of pondweed, and that of the other contained mainly pondweed.

GENERAL HABITS.—The Redhead is well named indeed, for seen in the right light his ruddy head burns as does that of a Red-headed Woodpecker. In flight, the white of his body makes a striking patch between



Photograph by Robert B. Rockwell

FIG. 15. Nest of Redhead
Well hidden in the friendly cat-tails

the black of his foreparts and the gray of his wing. The wing pattern shows well in flight in both sexes. The male in spring, Mr. Eaton says, has a peculiar note—*qua-quaa*—while the female has a quack “of distinctive tone and quality.”

The Redhead is one of our most notable ducks, and the abolition of shooting on Lake Burford assures protection on one of its few breeding grounds in the Rocky Mountain region.

While the Redheads are naturally deep-water species, those that we found on Lake Burford in the fall of 1904 were strikingly tame, staying with the Coots and Ruddy Ducks on a small tule and scirpus bordered lake. When the lake was visited by Mr. Ligon in July, he found some nests still containing eggs, and others with eggs lying outside near them. Skunks or other animals were evidently creating havoc among the ducks' nests and had undoubtedly eaten many hundreds of eggs. So persistent were their ravages that the ducks had largely stopped nesting above high water mark on the shores where there would naturally be the most favorable nesting sites, and were nesting out in the rushes where many eggs were lost owing to the changes in the level of the water.

ADDITIONAL LITERATURE.—BENT, A. C., Auk, XIX, 7-9, 1902; U. S. Nat. Mus. Bull. 126, 175-185, 1923.—ROCKWELL, R. B., Condor, XI, 112, 113, 1909; XIII, 189-193, 1911 (nest).—WETMORE, ALEXANDER, Auk, XXXVII, 243-244, 1920.

CANVASBACK: *Nyroca valisnéria* (Wilson)

DESCRIPTION.—*Length*: About 20-23.5 inches, wing 8.7-9.2, bill 2.1-2.5, greatest depth of bill .7-.8. *Weight*: $1\frac{7}{8}$ to $2\frac{1}{8}$ lbs. (Leopold). *Bill* long, high at base, and sloping down from low flat forehead.



From Handbook of Western Birds

FIG. 16. Canvasback

Adult male in breeding plumage: Head and neck mainly rufous-brown, crown and chin generally blackish; breast and foreparts of body black; rest of body and wings mainly white or light gray with very fine wavy cross lines of dusky, speculum bluish gray edged with white behind; rump, upper and lower tail coverts blackish; axillars white; wing linings pale gray; iris red, bill blackish, feet grayish blue. *Adult male in post-nuptial eclipse* (worn for only a short time): Head and neck mottled with brown, chest mixed with brown and gray, belly more or less mottled. *Adult female and young in juvenal plumage*: Color pattern of male but foreparts dull reddish brown, and back grayish brown, with wavy white barring; iris brown, bill, legs and feet similar to male.

RANGE.—Breeds in western North America from central Alaska (infrequently), northern Mackenzie, Saskatchewan, western Manitoba, and Minnesota south to central-western Nebraska, northern New Mexico, northern Utah, western Nevada,

and central Oregon; winters from southern British Columbia, northern Montana, northern Colorado, southern Illinois, eastward to Massachusetts and south to Florida, Gulf coast, and central Mexico.

STATE RECORDS.—The scarcity of records of the Canvasback in New Mexico from the early days to the present time indicates that it is a comparatively rare species in the State. A single bird was taken March 26, 1856, in the extreme southeastern part of New Mexico on Delaware Creek (Pope). [On Lake Burford May 23–June 19, 1918, three pairs were apparently nesting (Wetmore). It is fairly abundant at Silver City both spring and fall and one was taken, September 10, 1919 (Kellogg)]; Henry gave it as tolerably common in winter on the Rio Grande; and one was noted at Albuquerque January 29, 1900 (Birtwell). On the Carlsbad Bird Reserve a few were noted in February, 1914 (Wilder); and reported in January, 1915; [300–400 noted, December, 1916 (Willett). On the Rio Grande near Albuquerque a few are seen in late November (Leopold, 1919). Some are seen in Colfax County every year although they are not so numerous as formerly. Large flocks were reported by hunters and Mr. Grubb at Lake Burford before the name of the lake was changed (Charles Springer, 1925)].—W. W. COOKE.

NEST.—In tules or flags, over water, on muskrat houses, and sometimes on dry ground, a bulky mass of dead tules or grasses, lined with *gray* down. *Eggs*: Usually 7 to 9 (to which those of the Ruddy Duck or Redhead are often added as is the case with other slough-nesting ducks), grayish olive or greenish drab, darker than those of most ducks.

FOOD.—Mainly the seeds, tubers, and stems of water plants, as wild celery, wild rice, pondweed, eel grass, delta duck potato, arrow head, and rushes, with some insects, mollusks, and crustaceans.

GENERAL HABITS.—The aristocratic looking Canvasback, with his long high bill slanting down from the top of his head and his white blanket shining, is one of the famous ducks of the northern country that we welcome in New Mexico.

Although no nests have yet been found in the State and it is far south of the normal breeding range, three pairs have been seen on Lake Burford in the breeding season apparently settled for the summer, and it would be well to look carefully for nests. The males have, as Mr. Eaton describes it, "a peeping or growling note," while the females have a loud quack and when startled, "a screaming *curr-row*."

In the winter these handsome ducks gather in large numbers far enough south for open water, though some have been known to stay on large lakes when only air holes were left in the ice and they were becoming greatly emaciated, evidently from lack of food.

Doctor Chapman says that the famous Canvasback, "pursued for the market and as game, has decreased alarmingly, but in recent years, thanks to more stringent and better enforced laws, and particularly to the abolition of spring shooting, its numbers appear to be increasing" (Handbook).

ADDITIONAL LITERATURE.—BENT, A. C., Auk, XIX, 10–12, 1902 (nesting); U. S. Nat. Mus. Bull. 126, 189–202, 1923.—JOB, H. K., Outing, 515–525, February, 1914; Bull. 3, Nat. Assoc. Audubon Soc. (propagation of waterfowl).—ROCKWELL, R. B., Condor, XIII, 192, 194, 1911.

AMERICAN SCAUP DUCK: *Nyroca marila* (Linnaeus)

DESCRIPTION.—*Length:* 18-20 inches, wing 8.2-9, bill 1.8-2.2, greatest width of bill .8-1, least width .7-.9. *Bill short, broad and flat at end, with hooked nail; speculum white in all plumages. Adult male in winter and breeding plumage:* Head



From Handbook of Western Birds

FIG. 17. American Scaup Duck

neck, and foreparts black, head glossed with green, back and shoulders gray from fine wavy black and white lines—vermiculations; belly white, sides faintly scored with black; upper and under tail coverts black; axillars white; iris yellow, bill bluish with black nail, legs and toes lead color, webs blackish. *Adult male in post-nuptial eclipse:* Head dull brownish black, grayish on cheeks, neck with gray collar, nape and mantle vermiculated like back, flanks white, vermiculated with brown (Millais). *Adult female and young (adult female very variable; inner primaries white):* Black replaced by brown, yellowish brown on breast; belly white; base of bill encircled with white, or with two white spots; iris dark yellow; bill dull blue or grayish; toes lead color, webs blackish.

having a distinct white band partly or wholly encircling the base of the bill (Forbush). (See p. 138).

COMPARISONS.—The female Scaups and sometimes the Ring-necked are the only American ducks

RANGE.—Northern part of northern hemisphere. In North America breeds from Aleutian Islands, Bering Sea and northern Alaska along Arctic coasts of Canada south to Hudson Bay, and central Alberta (cripples and non-breeding birds seen in summer in British Columbia); winters mainly on coasts of United States, on the Pacific from Aleutians to southern California; on the Gulf—Louisiana and Texas—almost to Mexico; on the Atlantic coast from Maine to Florida. Fewer winter in the interior—on the Great Lakes and in the southwest—Colorado, Utah, Nevada, Arizona, and New Mexico.

STATE RECORDS.—On September 4, 1913, a large flock was seen near Koehler Junction, Colfax County (Kalmbach). On November 27 and 28, 1916, both the American Scaup and the Lesser Scaup were observed at Elephant Butte Lake by Willett, at such close range that the distinctive colors of the head were plainly seen. The Scaups were not so plentiful as the Lesser Scaups.

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 126, 207-216, 1923.

LESSER SCAUP DUCK: *Nyroca affinis* (Eyton)

DESCRIPTION.—*Length:* 15-16.5 inches, wing 7.5-8.2, bill 1.6-1.9, greatest width of bill .8-.9, least width .6-.7. *Speculum white in all plumages. Adult male in breeding plumage. Foreparts black, head glossed with purple (which may also appear greenish); back and shoulders gray from fine wavy black and white lines—vermiculations—belly white; sides strongly scored with black; iris yellow, bill bluish with black tip, feet plumbeous. Adult male in post-nuptial eclipse:* "Black dulled and white of back virtually obsolete" (Hollister). *Adult female and young:* Black replaced by brown, yellowish brown on breast; belly white; base of bill encircled with white or with two white spots; iris yellow, bill and feet like male but darker.

COMPARISONS.—Great care should be taken in identifying the two Scaups by the color of the head, for at different angles purple may look green. The female of

the American and Lesser Scaups can be distinguished mainly by size, and this varies so much that they are often confused, but in the American the inner primaries are white or nearly white.

RANGE.—Breeds in northern interior of North America; from Yukon Valley, Alaska, and northern limit of trees in Canada (Mackenzie and Anderson River regions), west shore of Hudson Bay, and southeastern Ontario south to Ohio, northeastern Colorado (not commonly), interior British Columbia, and southern Alaskan coast; winters from southern British Columbia, southeastern Arizona, northeastern Colorado, Arkansas, Illinois, and eastward to Long Island Sound south to Bahamas, Lesser Antilles, Panama, Pacific coast of Central America and Ecuador (non-breeding birds summer far south of breeding range).

STATE RECORDS.—The Lesser Scaup Ducks occur in New Mexico as migrants and rare winter residents; and a scaup, presumably the Lesser, has been recorded as wintering on the lower Rio Grande (Henry). [On the Rio Grande Bird Reserve they were noted November 23–December 9, 1916 (Willett). On the Rio Grande near Albuquerque they are not common, generally seen singly (Leopold, 1919).] On the Carlsbad Bird Reserve they were common January, 1915; [150 were noted December, 1916 (Willett)]. Several were seen about 60 miles west of Magdalena, April 26, 1915 (Ligon). [On Lake Burford, 10–12 pairs that did not seem to be nesting and a few unmated males in full plumage were seen May–June, 1918. Near by, on Hayden Lake, on June 1, 25 males and 23 females passed over (Wetmore).] A few were seen at Beaver Lake August 26, 1908 (Birdseye); and several on Horse and Burford Lakes, in late September, 1904 (Bailey). Flocks were seen near Koehler Junction, Colfax County, August 19 and 20, September 4, and October 7 and 19, 1913 (Kalmbach).—W. W. COOKE.

NEST.—Usually in a marsh, or a depression in dry grassy ground near water, when it is made of grass and weeds, generally lined with dark down. *Eggs*: 6 to 11, dark olive-buff.

FOOD.—Wild celery, wild rice, pondweeds, shellfish, crustaceans, and aquatic insects.

GENERAL HABITS.—Scaups of both species may be recognized at a distance by their black fronts and whitish sides, and, as they ride the waves or rise to flap the wings, by the white of the belly. In full adult plumage, with the sun shining on them, the blue of their bills is seen and the sides gleam almost like the white blanket of the Canvasback. In the hand the Lesser Scaup is seen to have the sides more noticeably vermiculated than the larger Scaup, and to have the black foreparts glossed with purple instead of green.

The name Scaup comes from the habit of these sea-going ducks of feeding on the beds of scalps or scallops. Besides their descriptive names of Bluebill and Blackhead they have also been named "Raft Ducks," from their habit of resting on the water in great compact flocks. At such times they seem the most phlegmatic of ducks, but during courtship they assume a new rôle. On a North Dakota lake, as I have noted, "two of the handsome black-fronted drakes and one of the brown ducks, were seen swimming around close together the twenty-first of June in what seemed to be courtship rivalry, late though it was. After swimming along peacefully together for a few moments, one of the drakes

would suddenly start after the other and dog his steps, swimming at his heels around and around as if trying to drive him off. The duck, meanwhile, holding her brown head high, apparently kept as far as possible from one of the rivals, though it was hard to tell which, the three swam within such a small circle. This droll performance was repeated a week later, but this time when two drakes and one duck were swimming around together a third drake happened along and seeing the group swam in rapidly as if to present his suit to the haughty lady. In any case, one suitor, presumably he, swam close to her ear. As before she held her disdainful head high and soon there were but two suitors, and at last but one" (1916, p. 55).

The spectacular courtship performances of over a hundred Lesser Scaups was witnessed by Dr. Charles W. Townsend on February 22, 1926, at Sanibel Island, on the west coast of Florida. The birds were crowded together, rapidly and nervously milling about and diving. "The males often jumped clear of the water, made graceful curves and entered it with wings close to the sides, but the astonishing part was that, as they disappeared, spurts and sometimes sheets of water were sent up by their feet" (1927, pp. 549-550).

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 126, 217-224, 1923.—WETMORE, ALEXANDER, Auk, XXXVII, 244-245, 1920.

RING-NECKED DUCK: *Nyroca collaris* (Donovan)

DESCRIPTION.—*Length:* 15.5-18 inches, wing 8, bill 1.7-2, tarsus 1.3-1.4. *Adult male in breeding plumage:* Foreparts, upperparts, and under tail coverts mainly black, with white triangular chin patch and inconspicuous chestnut collar; black of head glossed with green and purple; *speculum* gray; axillars and most of wing linings pure white; belly white, sides gray, vermiculated, separated from breast by white, upward pointing patch; iris yellow, bill dark gray with white bands at base and bordering tip; legs and feet dark. *Adult male in post-nuptial eclipse:* Color areas less sharply contrasted, black dulled, neck ring reduced and dulled, and white of belly partially obscured (after Hollister). *Adult female in winter and breeding plumage:* Face white around bill (absent in June): Upperparts dull brown, sides of head grayish brown, with whitish streak back of eye, *speculum* gray; chest and sides warm brown, belly white; iris brown, eye-ring white; bill blackish with indistinct light crossbar near tip. *Young in juvenal plumage:* Above dark brown with lighter feather edgings; below mottled with light brown and whitish; chin broadly white (Bent).

REMARKS.—The Ring-neck is essentially a fresh-water duck of the interior.

COMPARISONS.—The male Ring-neck, called also Ring-necked Scaup, Ring-necked Black-head, and by hunters, Ring-bill, may be known in life by his "suarish" head, the white rings on his broad bluish bill, his chestnut collar, white triangular chin spot, black back, bluish gray *speculum*, and the inverted white U or V at the bend of the wing, conspicuous when at rest on the water. The female has a gray, instead of a white, *speculum* as the Scaups have. Except for the white face band bordering the bill, which varies greatly in both female and immature plumages in both species, some having almost none (Forbush), she closely resembles the female

Redhead; but she is smaller and browner and has a whiter throat and darker back. (See p. 132.)

RANGE.—Breeds in interior of North America; from southern half of British Columbia, central Mackenzie Valley, Athabaska Lake, northern Saskatchewan, and western Ontario south to Illinois, Nebraska, and northern Utah; winters from southern British Columbia, probably Nevada, New Mexico, northern Texas, Arkansas, Illinois, and Chesapeake Bay south through Mexico to Guatemala.

STATE RECORDS.—The Ring-necked Duck is apparently very rare in New Mexico, but as it breeds north of the State and winters far to the southward, it would be strange if some individuals did not occasionally cross the State in migration. Henry in 1855 reported a few seen on the Mimbres and occasionally along the Rio Grande in winter [on the Rio Grande near Albuquerque Aldo Leopold reported one killed on December 10, 1918, and a few single birds were seen].—W. W. COOKE.

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 126, 224-230, 1923.

AMERICAN GOLDEN-EYE: *Glaucionetta clangula americana* Bonaparte

DESCRIPTION.—*Male:* Length 18.5-23 inches, wing 9-9.3, bill 1.9 depth at base, 1-1.1, tarsus 1.5-1.6. *Female:* Length about 16.5 inches, wing 7.9-8.3, bill 1.6, depth at base, .8-.9. *Adult male in winter and breeding plumage:* Puffy head black with green or violet reflections, and rounded white spot at base of bill; back black, tail gray; wing with large white patch; axillars and wing linings mainly blackish brown; neck and underparts white; iris golden-yellow, bill blackish, legs and toes orange or yellow, webs dusky. *Adult male in eclipse plumage:* Variable; similar to adult female but without white collar, with mottling on head and neck and more white in wing; some suggesting white head spot. *Adult female and young in first winter:* Variable; puffy head snuff brown without white spots; incomplete collar, white or gray; body mainly grayish or brownish except for black rump and white belly; wings with white speculum, axillars and wing linings blackish brown; iris yellow, bill dusky, toes orange or yellowish, webs blackish.



From Handbook of Western Birds

FIG. 18. American Golden-eye

RANGE.—Breeds mainly north of the United States entirely across the continent; from central Alaska, southern Mackenzie, Hudson Bay region, Labrador, and Newfoundland south to northern New England, Michigan, North Dakota, northwestern Montana, and southern British Columbia; winters on cold coasts and large lakes south of frozen areas from the Commander and Aleutian Islands, British Columbia, northwestern Montana, Nebraska, Great Lakes, Gulf of St. Lawrence, and Maine south to Florida, Gulf States, central western Mexico, and southern California; occasionally to Arizona (Tucson) and Texas (Galveston and Corpus Christi).

STATE RECORDS.—On the Carlsbad Bird Reserve the Golden-eye was seen January, 1915, during the winter of 1915-16; 100 noted in December, 1916. On the Rio Grande Bird Reserve (Elephant Butte), it was also noted November 23-December 9, 1916 (Willett). On the Rio Grande near Albuquerque a few, generally single birds occur in December and January (Leopold, 1919). It is found on mountain lakes in Colfax County (Charles Springer, 1925).

FOOD.—Largely shellfish and other aquatic animals, including crabs, isopods, and snails, and also seeds and vegetation, as panicum, eel-grass, wild celery; besides dragon-fly nymphs, and caddice larvae.

GENERAL HABITS.—The green head with the round white spot at the base of the bill is enough to distinguish the drake Golden-eye in his full dress; while the puffy brown head, light collar, and white wing patch are good field characters in the female. In flight the Golden-eye is known by "the big round head and short stocky neck" and by the extraordinary whistling sound made by its wings. This musical whistling of the wings, Mr. Alfred M. Bailey says, "is one of the pleasing features of winter work along Alaskan waters" (1927, p. 187).

As the birds have been seen in New Mexico as late as February and March, fortunate observers may be able to see them engaged in their remarkable courtship actions, which, in Massachusetts, Doctor Townsend says, "begin on mild days in February and continue until the departure of the birds for the north in April. The courtship action varies considerably," the Doctor continues, "but a typical and complete one may be described as follows: One or more males swim restlessly back and forth and around a female. The feathers of the cheeks and crest of the male are so erected that the head looks large and round, the neck correspondingly small. As he swims along the head is thrust out in front close to the water, occasionally dabbing at it. Suddenly he springs forward, elevating his breast, and at the same time he enters on the most typical and essential part of the performance. The neck is stretched straight up, and the bill, pointing to the zenith, is opened to emit a harsh, rasping double-note, *zzee-at*, vibratory and searching in character. The head is then quickly snapped back until the occiput touches the rump, whence it is brought forward again with a jerk to the normal position. As the head is returned to its place the bird often springs forward kicking the water in a spurt out behind and displaying like a flash of flame the orange-colored legs.

"This appears to be the complete performance, and the female, although usually passive, sometimes responds by protruding her head close to the water in front, and then bringing it up so that it also points to the zenith" (1910, pp. 177-178). After a careful, detailed study Mr. Brewster, in an article in which the poses were shown by Louis Agassiz Fuertes, characterized the gesticulations as the nod, the kick, the forward thrust, the upward thrust, and the back thrust; and the "fixed and peculiar attitudes," as the crouching pose, the wounded-duck pose, the bow-sprit pose, the mast-head pose, and the folded duck-skin pose (1911a, p. 25).

The Golden-eye's nesting habits, though not so spectacular as the courtship performances, are most interesting. Speaking of a nest in a hollow tree that he watched, Mr. Bent says, "We heard a great

scrambling and scratching going on inside as the duck climbed up the small opening, through which she wriggled out with some difficulty and flew away" (1925, p. 3). And Mr. H. K. Job, describing a nest that he climbed a tree to look into, writes, "The mother lay at the bottom, surrounded by a beautiful flock of black and white young. Some of them were on the old duck's back; others were under her, apparently, and several of them were moving around in the limited chamber, picking at the chips on the bottom" (1902, pp. 197-199).

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 130, 1-14, 1925.
—BREWSTER, WILLIAM, Bull. Mus. Comp. Zool. Harvard, LXVI, 142-163, 1924; Condor, XIII, 22-30, 1911.—HUXLEY, J. S., Auk, XXXIII, 142-161, 256-270, 1916 (courtship).—SAWYER, E. J., Wilson Bull., XL, pp. 5-17, 1928 (courtship).

BUFFLE-HEAD: *Charitonetta albéola* (Linnaeus)

DESCRIPTION.—*Male:* Length 14.2-15.2 inches, wing 6.7-6.9, bill 1.1. *Female:* Length 12.2-13.5 inches, wing 5.9-6, bill .9. Bill short and pointed, head round, body small and plump. *Adult male in breeding plumage:* Head puffy, rich purple, green, and bluish, with broad white patch extending around back of head; back black; rest of body mainly white; wings with extensive white patch; axillars and wing linings mottled dusky and white; iris dark brown, bill slaty, nail black; legs and feet flesh color. *Adult male in eclipse plumage:* Similar to adult winter female but with more white on wing and sides of head. *Adult female in winter and breeding plumage:* Upperparts mainly dusky, head with white ear streak, fore neck with white collar, and wing with white patch; chest, sides and under tail coverts dusky, rest of underparts white; iris yellowish; legs and feet grayish, usually tinged with pink. *Adult female in eclipse plumage:* Similar, but without white on neck and in scapulars. *Young in juvenal plumage:* Female like adult female but head and throat lighter and white head patch smaller. Male larger, with larger head patch.



From Handbook of Western Birds

FIG. 19. Buffle-head

RANGE.—Breeds mainly in the interior of Canada; from the Upper Yukon, the Lower Mackenzie, Great Slave Lake, and southwestern coasts of Hudson Bay and James Bay south to Ontario, northern Montana and British Columbia; winters mainly in the United States, across the continent from the Aleutians, British Columbia, northwestern Montana, the Great Lakes, and Maine, south to Florida, the Gulf coast, less commonly or rarely to central Mexico and Lower California.

COMPARISONS.—At a distance the male Buffle-head may suggest the Hooded Merganser, but the Merganser's white patch does not extend around the back of the head, its lower neck is black, and its bill slender. The female Buffle-head is distinguished from the female Ruddy by the white patch on the side of her head. At a distance, in flight, she resembles a Golden-eye, but usually flies nearer the water with wings beating faster (Forbush). (See pp. 146, 143, 149.)

STATE RECORDS.—The Buffle-head should be a fairly common migrant in New Mexico, judging by its records to the north and south in Colorado and Mexico.

Henry reported it from the Mimbres River in April, and Mearns took a specimen April 8, 1892, at Lake Palomas, Chihuahua, hardly more than a mile over the boundary from New Mexico. On the Carlsbad Bird Reserve it is said to occur regularly in small numbers; it was noted in 1914 in February (Wilder); [20 seen December, 1916. On the Rio Grande Bird Reserve (Elephant Butte), noted November 23-December 9, 1916 (Willett)].—W. W. COOKE.

FOOD.—Crabs, mussels, bivalves, snails, minnows, and other aquatic animals, caddice and syrphid larvae, and wild celery, seeds, and other vegetation.

GENERAL HABITS.—The common name of Butter-ball used by sportsmen comes from the fact that the plump body of the little Duck is encased with fat, while the name of Spirit Duck refers to its quick diving, here one moment, there another. When necessary it swims long distances under water, using both wings and feet.

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 130, 24-32, 1925.

WHITE-WINGED SCOTER: *Melanitta deglandi* (Bonaparte)

DESCRIPTION.—*Length*: 19.7-23 inches, wing 10.6-11.4, bill 1.4-1.7, depth of upper mandible at base 1.1-1.3, tarsus 1.8-2.1. *Bill swollen at base*, feathers coming close to nostrils. *Adult male in winter and breeding plumage*: Black, slightly brownish on sides and belly, with *white eye patch*, and *conspicuous white wing patch*; iris white; bill with knob at base black, ridge, white, tip orange; legs and feet with outer sides purplish, inner sides orange or red. *Adult female in winter and breeding plumage*: Sooty above, in fresh plumage without white on head but as feather tips wear, with white patches (Dwight); wing patch white but smaller than in male; underparts grayish brown, partly tipped with grayish; iris brown; bill blackish mixed with whitish above, sometimes with patch of rose-pink on either side and striped on nail with yellowish; feet similar to those of male but duller. *Young in juvenal plumage*: Somewhat variable; dark brown above, lighter and mottled below; conspicuous whitish patches in front and back of eye, white wing patch tipped with dusky.

RANGE.—North America and eastern Asia. In America breeds from the barren grounds of northern Alaska and Canada south to north shore of Gulf of St. Lawrence, Hudson Bay, North Dakota, Saskatchewan, Alberta, and northeastern Washington (non-breeding birds seen in summer in British Columbia); winters mainly on the sea coasts, on the Pacific from the Commander, Pribilof, and Aleutian Islands south to Lower California; in the interior on the Great Lakes, in Louisiana, Colorado, New Mexico, and occasionally southern British Columbia; on the Atlantic from the Gulf of St. Lawrence to South Carolina and (rarely) Florida.

STATE RECORDS.—An adult female was brought to R. T. Kellogg, November 10, 1921. It had been taken from a flock of six, on a small irrigation pond on Duck Creek, 30 miles northwest of Silver City.

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 130, 131-142, 1925.—JOB, H. K., Auk. XVI, 163-164, 1899.

SPINY-TAILED DUCKS: Subfamily *Erismaturinae*

RUDDY DUCK: *Erismatura jamaicensis rubida* (Wilson)

DESCRIPTION.—*Length*: About 13.5-16 inches, wing 5.7-6, bill about 1.5-1.6. Bill broad, short, flat, nail hooked; body stout, chunky, neck thick and short, *tail feathers stiff, narrow, pointed*; when abraded, like the spines of the Chimney Swift. *Adult male in breeding plumage*: Top and sides of head to below eye, black; cheeks

white; most of *upperparts, neck, and sides of breast, bright reddish brown; spiked fan-like tail held erect*, blackish brown; wings brown, axillars and wing linings white marked with brown; underparts silky white, watered with dusky; iris reddish brown or hazel, bill bright blue, legs and toes bluish gray, webs darker. *Adult male in fall and winter plumage* (corresponding to short eclipse plumage of other ducks):

Similar to summer male but black of head replaced by blackish brown; upperparts mainly dark brown peppered with ash gray; throat and broad collar, ashy brown; bill and feet darker than in breeding plumage. In any plumage wings and tail may be pale ashy due to wear and fading. *Adult female*: Similar to winter male but cap narrowly barred with reddish brown, cheek crossed with dark stripe; upperparts dark brown finely barred, mixed with ashy or buffy brown; breast indistinctly

barred with black and brown; rest of underparts white, brown bases sometimes showing through and giving barred effect; bill dusky or duller than in male. *Young in juvenal plumage*: Similar to female but cheeks and throat white, mottled; feathers of crown and breast tipped with buffy.



From Handbook of Western Birds

FIG. 20. Ruddy Duck

RANGE.—Breeds mainly in the sloughs and marshes of central and western North America; from southern British Columbia, Great Slave Lake, Saskatchewan, northern Manitoba, and northern Quebec south to Illinois, Michigan, south-central Texas, northern New Mexico, central Arizona, and Lower California; rarely and locally in eastern states, Mexico and Guatemala; winters from southwestern British Columbia, Arizona, New Mexico, southern Illinois, and Massachusetts, south to Lesser Antilles, and Costa Rica.

STATE RECORDS.—The Ruddy Duck is very irregular in its choice of a nesting site; it breeds locally from Great Slave Lake to Guatemala and is not rare in summer at a few places in northern New Mexico and central Colorado, although almost unknown at that season for a radius of several hundred miles. Half a dozen adults were found at La Jara Lake, September 17, 1904, where they were evidently on their breeding grounds, as young of different sizes were seen. A downy young and an adult were collected; the latter with entire wings in pin feathers so that it could not fly. The species was abundant at the Burford lakes, breeding in the tules with the coots, and downy young were taken there September 27, 1904 (Bailey). The nesting season is evidently a long one for on July 29, 1913, there were half-grown young and the species was common both on Lake Burford and Clear Lake (Ligon). It was taken June 2, 1903, on a lake near Santa Rosa (Bailey), and June 10, 1855, near the Pecos close to the Texas-New Mexico boundary (Pope); it probably breeds at both these localities, and has been reported as breeding on the Carlsbad Bird Reserve (Willett). [On Lake Burford in July, 1916, it was found in great abundance (Ligon); and in May-June, 1918, was one of the commonest ducks, 55 pairs being estimated as breeding (Wetmore). On the Rio Grande Gun Club lake southwest of Albuquerque several were seen June 16, 1919 (Ligon).]

Fall migrants were noted August 26, 1908, on Beaver Lake (Birdseye); a single bird was seen at a little pond in the Bear Spring Mountains September 29, 1905 (Hollister); one October 7, 1900, at Albuquerque (Birtwell); and one at the Old Crater near Zuni (Henshaw). It was noted on the Mimbres, in 1911-1914 (Rockhill); at Chloride, April 25, 1915 (Ligon). [Several were also seen at North Lake, 35 miles northwest of Magdalena, October 3-8, 1916 (Ligon). At Silver City it is found in limited numbers both spring and fall (Kellogg, 1927).]

In winter one was noted February 26, 1903, at Mesilla Park (Ford). On the Carlsbad Bird Reserve a few were seen, January, 1915, and others noted during the winter of 1915-16 (Willett). [At Las Lunas one was taken January 26, 1919, in nearly full adult male plumage (Leopold).]—W. W. COOKE.

In the spring migration, on the Carlsbad Reserve, it was noted March 6, 1914, and 150 estimated April 29, 1914 (Cooper); perhaps 25 were seen about 60 miles west of Magdalena, April 26, 1913 (Ligon). [At Silver City it is found in limited numbers both spring and fall (Kellogg, 1927).]

NEST.—In tules, cat-tails, sedges, or on an old muskrat house near or over water, sometimes a bulky mass of the surrounding plant stems, lined with dull whitish down. *Eggs*: Usually 6 to 10, grayish white to buffy white, shell "rough and granular . . . very large for size of bird" (Bent).

FOOD.—Chiefly roots, seeds, and tender stems of water plants as flags, wild celery, wild rice, wild rye, duckweed, and pondweeds, but also grass and sedge, aquatic insects and larvae, locusts and other insects, snails, mussels, crabs, and other shellfish.

GENERAL HABITS.—When we visited Lake Burford in 1904, on the main lake and in the marshes adjoining it we found "vast throngs of excitable migrating waterfowl, breaking away with a roar if a crow cawed, rising in thundering multitudes if a gun went off along shore," and it was a grateful relief to come back to the small tule-bordered lake the other side of the passes where American Coots and Ruddy Ducks acted at home on their peaceful breeding grounds. While the Coots were diving and swimming "the chunky little Ruddy Ducks, the males with handsome ruddy bodies, sat with spread fan tails erect at their backs, often with their stocky heads over their shoulders so the clear white cheek patches showed across the lake." The white base of the fan tail also made a striking recognition mark.

"Downy young Ruddies were seen swimming around among the tules with their parents although it was September, and half-grown birds were seen among the groups of Coots" (1910c, pp. 424-425). As we walked around the lake all the migratory ducks flew before us, but the dark horde of Redheads, Coots, and Ruddies merely shifted as we passed from one part of the lake to another.

When Lake Burford was visited by Mr. Ligon in July, 1916, he found the Ruddies abundant. At one time, he says, "as I sat on a rise at the edge of the lake about two hundred of these little fellows paraded back and forth just out of the line of water grass. Young were common at this time" (MS).

Since then spring shooting has been prohibited and visitors interested in wild life will now have rare opportunity to watch the hordes of waterfowl that assemble there to breed.

Few birds are more worth watching than the individual Ruddy, or Wire-tail, especially during his days of courtship. At that time his bill is bright blue and his chunky body bright ruddy. Two pairs that I once happened on in North Dakota were in the midst of their animated

courtship play, "the puffy little drakes looking very cocky and belligerent, suggesting pouter doves with their air of importance and the curious muscular efforts by which they produced their strange notes. When I first saw one perform, not knowing about his trachial air-sac, which Doctor Wetmore discovered and which is apparently used as a tympanum, I thought he was picking at his breast or had something stuck in his throat and was choking. With quick nods of the head that jerked the chin in, he pumped up and down, till finally a harsh guttural cluck was emitted from his smooth blue bill. Often in doing chin exercises the little drakes produced a labored *ip-ip-ip-ip-ip-cluck*'. At the last syllable, with the effort of expulsion, the vertical spike tail pressed down, and then sprang erect again" (1919, p. 8).

Another time I happened on a peaceful conjugal scene in the safe harbor of the tules. The duck sitting on the water back among the short tules was apparently napping, while the drake just outside with blue bill on his ruddy breast rocked gently on the wavelets or bobbed like a fat cork if a breeze puffed in a bit larger wavelet from the big quiet lake beyond. But the best sight of all was that of a father Ruddy leading off through the tule lanes followed by his mate and a line of downy young—a rare sight in the duck world where most females with broods, like female hummingbirds, appear usually in the rôle of widowed mothers. Why the Ruddy does not molt into eclipse when other ducks do and so can stay with his mate and help care for the young is one of the many questions for the student of this most individual duck to investigate.

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 130, 152-161, 1925.—ROCKWELL, R. B., Condor, XIII, 190-195, 1911 (nest).—WETMORE, ALEXANDER, Condor, XX, 19-20, 1918 (trachial air-sacs); Auk, XXXVII, 245-247, 1920.

MERGANSERS; Subfamily Merginae

The Mergansers, a small group of fish-eating ducks, like the Cormorants and Loons, are adapted to pursuing their prey under water by means of their feet alone, and like the diving Sea Ducks have a lobed hind toe. The bill is narrow, nearly cylindrical, hooked at the tip, and serrate—from which comes the name, Sawbills—"constructed especially for seizing and holding lively, active and slippery prey" (Forbush).

HOODED MERGANSER: *Lophodytes cucullatus* (Linnaeus)

DESCRIPTION.—*Length*: About 17.2-19.2 inches, wing 7.5-7.9, bill 1.5. Bill shorter than head, narrow, rounded, serrated. *Adult male in winter and breeding plumage*: Black fan-shaped crest with white patch (when lowered, a narrow white triangle opened backward, Forbush), rest of upperparts black, except for brown rump and tail and on sides of breast crescentic white gashings extending up from white underparts; sides reddish brown, crosslined with black; speculum white with two black bars; flight feathers dark brown; axillars and wing linings mainly white; iris

yellow, bill black, legs and feet yellowish brown. *Adult male in post-nuptial eclipse* (only a partial eclipse): Dull brown like the female (Wetmore). *Adult female*: Crest cinnamon, smaller than in male and more bushy; underparts brownish; wing and tail dark brown, speculum white with two black bars, *neck and breast largely*

brown, median underparts white; iris brown, bill black, lower mandible yellow or orange; legs and feet dusky. *Young in juvenal plumage*: Similar to female but with little or no crest and plumage browner.



From Handbook of Western Birds

FIG. 21. Hooded Merganser

COMPARISONS.—The female Hooded Merganser may be distinguished from other female Mergansers by her smaller size, and darker breast. (See pp. 147, 149.)

RANGE.—Breeds locally in wooded regions north to tree limit from southeastern Alaska, northwestern British Columbia, Great Slave Lake, Hudson Bay, Ontario, and New Brunswick south to Florida, Louisiana, western Nevada, and Oregon; winters from southeastern Alaska, southern British Columbia, Utah, Nebraska, east to

Massachusetts and south to Cuba, the Gulf States, Mexico, and Lower California.

STATE RECORDS.—The normal breeding range of the Hooded Merganser stretches from ocean to ocean in the northern United States and extends south to Florida, but in the Rocky Mountain region there is no certain breeding record south of Wyoming. The one recorded for New Mexico is probably an error, though the species occurs in the State during migration and was noted November 14, 1846, near Socorro (Abert), and one taken November 21, 1855, at Dona Ana (Pope). [A pair were taken November 29, 1919, on Lyon Dyke, an irrigation pond on Duck Creek, 30 miles northwest of Silver City (Kellogg).] The species was found by Henry on the Mimbres during the winter and spring and less commonly on the Rio Grande near Fort Thorn. On the Carlsbad Bird Reserve, it was found fairly common, January, 1915; noted during the winter of 1915–16; and [several flocks seen, December, 1916 (Willett)].—W. W. COOKE.

NEST.—In hollows of trees or stumps, sometimes in nesting boxes (rarely on ground), lined with grass, leaves, feathers, and down. *Eggs*: Usually 8 to 10, white (often nest stained).

FOOD.—Small fish, crawfish, crabs, shrimps, tadpoles, frogs, bivalves, snails, sand eels, dragon fly nymphs, caddice-fly larvae, water beetles, and other aquatic insects; seeds and roots of aquatic plants, and an occasional shrew.

GENERAL HABITS.—Like the American Merganser, the Hooded nests in a hollow tree or stump near water, but its eggs are whiter than those of its relatives. In the plumage of the Hooded drake the striking 'secant' gashings of white on black and black on white and the "ruptive" white crest patch in the black fan, cut and break up the form of the bird, helping to obliterate him from his landscape. And his landscape,

instead of that bordering rushing mountain streams is that bordering sluggish wooded ponds and streams. Here, as Mr. Eaton says, "it is a beautiful sight to watch a company of these birds swimming briskly along among the lily pads, all flashing and closing their crests in time to their advance" (1909, I, 182).

AMERICAN MERGANSER: *Mergus americanus* Cassin

DESCRIPTION.—*Male*: Length 25–27 inches, wing 10.5–11.2, bill 1.9–2.2, tarsus 1.9–2. *Female*: Length 21–24 inches, wing 9.6–9.7, bill 1.8–2, tarsus 1.8–1.9. Bill long, narrow, serrated, tip overhanging, nostrils nearer middle than base. *Adult male in winter and breeding plumage*: Head black glossed with green, barely crested (crest not seen unless erected), hind neck and entire underparts white or pale salmon; forepart of back, black, hinder part and tail gray; wing largely white, with one black bar, flight feathers blackish; axillars and wing linings mainly white; iris, bill, legs, and feet red. *Adult male in post-nuptial eclipse*: "Closely similar to adult female" (Wetmore), but without long crest. *Adult female*: Head and long, thin, horizontal crest tawny or cinnamon-brown; upperparts gray, speculum white crossed by one dusky bar; chin white, separated from white patch on throat by brown collar, neck grayish; underparts creamy or buffy. *Young in first winter plumage*: Similar to adult female but throat white down to chest.

COMPARISONS.—At long range the female American and Red-breasted are difficult to distinguish, but in the American the head is slightly darker, the back grayish rather than brownish, while the white of the chin contrasts sharply with the brown of the head, instead of fading into it. At close range the single crest of the American may distinguish it from the double-crested Red-breasted. In the hand the bill characters determine the species. (See p. 148.)

RANGE.—Breeds from southern Alaska, Great Slave Lake, Hudson Bay, Quebec, and Newfoundland south to Maine, Michigan, South Dakota, and central Oregon; in mountains south to northern New Mexico, north-central Arizona, and central California; winters from Aleutians, British Columbia, Idaho, northern Colorado, Great Lakes, New Brunswick, and Maine south to Gulf States, northern Mexico (Chihuahua), and northern Lower California.

STATE RECORDS.—One of the most southern American Merganser breeding records in the United States is that of Col. Goss, who on July 2, 1885, found a female and four little ones not over ten days old, at 8,600 feet near the head of the Pecos River at latitude 35° 45' east of Santa Fe (1887, p. 344).

The species was formerly rather common in migration. It was noted as common November 16, 1846, near Socorro (Abert), and there was a specimen in the United States National Museum taken by Capt. Pope November 17, 1855, at Dona Ana. A specimen was taken November 20, 1903, at Tortugas Lake (Ford).

Henry says that in his day, 1850–1856, the Merganser was not rare during the fall and winter, along the Rio Grande and the Rio Mimbres which would be near the southern limit of the winter range of the species. [Aldo Leopold reported, in 1919, that both American and Red-breasted Mergansers winter commonly on the Rio Grande, arriving about December 1. On the Carlsbad Bird Reserve the American was reported common on the lakes, January, 1915, and 500 were estimated December, 1916. On the Rio Grande Bird Reserve it was noted December 9, 1916 (Willett). In the spring migrating flocks were seen at Lake Burford in May and June, 1918—a small flock, May 27; 14 pairs, May 30; 4 males and 2 females June 3; 25 males, June 10; and a single male, June 15 (Wetmore).]—W. W. COOKE.

NEST.—Usually in hollow trees or stumps, but sometimes on the ground, or in holes under boulders, lined with twigs, moss, leaves, grasses, and light grayish white breast down, usually mixed with white breast feathers. *Eggs*: 6 to 17 creamy buff.

FOOD.—Small fish (many predatory), eels, aquatic salamanders, frogs, crawfish, snails, bivalves, and leeches; caddice-fly larvae and winged ants; and occasionally seeds, stems, and roots of aquatic vegetation.

GENERAL HABITS.—The descriptive names of Buff-breasted Shel-drake for the drake and Dun-diver or Morocco-head for the duck seem to belong to this species; but the name Saw-bill is also applied to the Red-breasted and Hooded Mergansers. Goosander and Sheldrake are also common names for the American. As Mr. Henshaw says, "the narrow, serrated bill of the Goosander as contrasted with the broad, smooth bills of most ducks would suggest to the merest tyro that its habits must differ widely from those of most of its kin," and he adds that its bill "with its saw-like teeth, is especially adapted to seizing and holding slippery prey of various kinds." Its long narrow body, as he also notes, "eminently fits it for swift progress under water where it spends much of its time" (1918, p. 108). It is, too, so well clad that it may winter wherever open water and food are found.

On the bird reservation at Carlsbad in January, 1917, Mr. Willett estimated that there were about a thousand American and Red-breasted Mergansers, the American being the more abundant of the two. They were plentiful all winter, the Hooded occurring also but in smaller numbers. Gadwall, Mallards, Shovellers, and Pintails were also plentiful, Green-winged Teal abundant, the Blue-winged less so, Redheads and Golden-eyes occasionally seen.

In Alaska Mr. Swarth saw the American Mergansers swimming slowly with neck outstretched and bill held at the surface of the water, filtering their food as the Shoveller does. He also noted a peculiar habit which made them conspicuous during the summer; individuals rising high in the air and circling around for hours at a time, making at frequent and regular intervals "a most unmelodious squawk," distinguishable from the "coarse masculine quack" of the duck. Several times an old Merganser was seen "floating gently down a stream, with may be half a dozen downy young surrounding her, and with three or four perched on her back" (1911a, pp. 39-40).

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 126, 1-13, 1923.

RED-BREASTED MERGANSER: *Mergus serrator* Linnaeus

DESCRIPTION.—*Length*: About 20-25 inches, wing 8.6-9, bill about 2.5, tarsus 1.8-1.9. Bill long, narrow, serrate, *nostrils* near base. *Adult male in winter and breeding plumage*: Head with *double-pointed occipital crest* black, glossed with green; neck with *white collar*; forepart of back black, middle and hinder part gray waved with white and dusky; tail gray; surface of closed wing mostly white, crossed

by *two* black bars, flight feathers black, tuft of black and white feathers near bend of wing; *chest with brown band spotted with black*; sides vermiculated, rest of underparts mainly white; iris, bill, legs and feet red. *Adult male in post-nuptial eclipse:*



From Handbook of Western Birds

FIG. 22. Red-breasted Merganser

Dark green of the head replaced by dull brown which extends down to the dark breast band, so obliterating the white collar (Wetmore). *Adult female:* Head and crest *light brown*, largely cinnamon; *upperparts ashy brown*, feathers with dark centers; speculum white, with *two* black bars; flight feathers dull black; iris, bill,



From Biological Survey

FIG. 23. Downy Red-breasted Merganser

Sitting up, but on very wobbly legs

legs and feet dull red. *Young male in first winter:* Like adult female but black feathers appearing on head, back, and wings.

RANGE.—Northern parts of Northern Hemisphere. In North America, breeds from Arctic coast of Alaska, Mackenzie, and Greenland south to Maine, New

York, Minnesota, Manitoba, and southern Washington; winters (mainly on coast) from southern British Columbia, northern United States, Great Lakes, Ontario, and Maine south to Florida, Gulf coast, and Lower California.

STATE RECORDS.—From its summer home in Canada the Red-breasted Merganser occurs in migration and winter throughout most of the United States, but is rare in the Rocky Mountain region. A flock of eight were seen April 29, 1904, at Rinconada, at 5,600 feet (Surber), one of which was secured and is now in the collection of the Biological Survey. [On the Carlsbad Bird Reserve the species was noted February 18, 1914 (Wilder); it was said to be abundant, January, 1915, and 500 were noted December, 1916; also on the Rio Grande Bird Reserve (Elephant Butte), it was noted November 23–December 9, 1916 (Willett), and on the Rio Grande in the vicinity of Albuquerque it winters commonly, arriving about December 1 (Leopold).]—W. W. COOKE.

NEST.—Generally on the ground, near water, hidden by grass, bushes, rocks, or trees, made of leaves, grass, and moss, lined with mouse-gray breast down with paler centers and usually white feathers of female. *Eggs*: Generally 8 to 10, creamy or olive-buff, darker than those of Merganser.

FOOD.—Largely small fish but also other aquatic animal life, as frogs, mollusks and crustaceans.

GENERAL HABITS.—Both the American and the Red-breasted Mergansers frequent rapid mountain streams and interior lakes and ponds, but the Red-breasted is more often seen on larger waters and may also be looked for on salt water. When fishing, these interesting ducks like the Sheldrakes have been seen hunting in companies. On Lake Ontario Mr. Eaton has often watched them, "a large flock sometimes advancing with wide extended front, driving the fish before them and diving simultaneously so that which ever way their prey may dart there is a serrated beak and capacious gullet ready to receive them" (1909, p. 180).

Unlike the other mergansers, the Red-breasted habitually nests on the ground, although sometimes in trees (Taverner).

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 126, 13–22, 1923.—STRONG, R. M., Auk, XXIX, 479–488, 1912.—TOWNSEND, C. W., Auk, XXVIII, 341–345, 1911 (courtship).

VULTURES, HAWKS, AND EAGLES: Order Falconiformes

PLATE 9

"In the higher types the whole structure betokens strength, activity, and ferocity, carnivorous propensities and predacious nature. Most of the smaller or weaker species feed much upon insects; others more particularly upon reptiles and fish; others upon carrion; but the majority prey upon other birds, and small mammals, captured in open warfare. To this end the claws no less than the [hooked] beak are especially adapted by their development in the 'talons,' as a rule of great size, strength, and acuteness" (Coues). The nostrils are generally set in a cere, a naked skin or membrane, often brightly colored. "In the case



SOARING VULTURES, HAWKS, AND EAGLES

TURKEY VULTURE
 WESTERN GOSHAWK (♀ ad.)
 COOPER HAWK (♀ ad.)
 SHARP-SHINNED HAWK (♀ ad.)
 WESTERN RED-TAIL (♀ ad.)
 ZONE-TAILED HAWK (♀ ad.)
 SWAINSON HAWK (♀ ad.)
 (Light phase)

AMERICAN ROUGH-LEGGED HAWK
 (♀ ad.)
 FERRUGINOUS ROUGH-LEG (♀ ad.)
 HARRIS HAWK (♀ ad.)
 MEXICAN GOSHAWK (♀ ad.)
 MEXICAN BLACK HAWK (ad.)
 GOLDEN EAGLE (♀ im.)
 BALD EAGLE (♀ ad.)

MARSH HAWK (♀ ad.)
 OSPREY (♂ ad.)
 PRAIRIE FALCON (♀ ad.)
 DUCK HAWK (♀ ad.)
 APLOMADO FALCON (♀ ad.)
 PIGEON HAWK (♂)
 SPARROW HAWK (♂)

of the birds of prey as in some of the other orders, the indigestible portions of food, as feathers, hair, bones, and the hard coverings of insects, are formed into balls by the movements of the stomach, after the nutritious portions have been absorbed. These masses, which are known as 'pellets,' are regurgitated from the stomach before a new supply of food is taken" (Fisher). For purposes of recognition, the varied patterns of the wing linings serve well (see Plate 9).

REFERENCES.—FISHER, A. K., U. S. Dept. Agr. Bull. 3, 1893; Yearbook Dept. Agr. for 1894.—GARDNER, LEON L., Proc. U. S. Nat. Mus., vol. 67, art. 19, pp. 7, 9, 15-16, pls. 2, 6, 9.—GLOYD, HOWARD KAY, Wilson Bull., XXXVII, pp. 133-149, 1925 (helps to identification).—SETON-THOMPSON, ERNEST, Bird-Lore, III, 187-189, 1901 (recognition marks).—THAYER, G. H., Concealing-Coloration in the Animal Kingdom, pp. 80-81, 1909.

AMERICAN VULTURES: Family Cathartidae

The carrion-feeding Vultures differ from the Birds of Prey in largely naked head and in form of bill and feet. The bill is little-raptorial, lengthened, little-hooked, comparatively weak; the feet are scarcely raptorial, with weak, little-curved claws, small hind toe, elevated; front toes webbed at base.

TURKEY VULTURE: *Cathartes aura septentrionalis* Wied

PLATE 9

DESCRIPTION.—*Length:* 26-32 inches, wing 20-23, extent about 6 feet, tail 11-12, bill 1, tarsus 2.3, middle toe, 2.5. *Adults:* Bare head dull crimson; upper parts blackish, with a greenish and violet gloss, feathers of back, wing coverts and secondaries margined with grayish brown; *wing linings blackish strikingly contrasted with ash gray of quills;* underparts uniform dull black; iris brown, bill whitish, cere red, legs and feet whitish. *Young in juvenal plumage:* Like adults, but bill and naked skin blackish, wing coverts with less distinct brownish margins.

RANGE.—Breeds in Austral and Transition Zones from southern British Columbia, Saskatchewan, Alberta, southern Manitoba, northern Minnesota to southeastern Ontario, and southern New England south to Gulf coast, northern Mexico, and southern Lower California; winters in most of its Atlantic slope range but westward retires south to the Ohio Valley, Nebraska, and California (one winter record for British Columbia).



FIG. 24. Turkey Vulture



FIG. 25. Foot of Turkey Vulture

STATE RECORDS.—[There are almost no positive breeding records of the Turkey Vulture in New Mexico; in fact there seem to be only three records of the actual finding of the nest in the State, but since the bird is found all summer over most of the lower parts of New Mexico, most commonly below 7,000 feet, during May and June, it undoubtedly breeds over much of this area. The first nest recorded was found by E. F. Pope, May 25, 1919, 12 miles southwest of Vaughn in a crevice in rocks, 24 inches from the entrance. The two characteristic eggs had recently been sucked. One of the vultures, presumably the parent, was seen near by. The second nest recorded was reported to Bailey, in April, 1924, from the canyon below the Carlsbad Cave and contained white downy young. By the middle of

April adults were found in the caves and about the cliffs apparently hunting for nesting sites (Bailey). A third nest was found by Jensen on May 27, 1928, "under a pile of bowlders under the rimrock two miles east of Cerillas. It contained two heavily incubated eggs." At Lake Burford, May-June, 1918, the birds were fairly common, probably nesting in the canyon below (Wetmore). On June 22, 1919, a single one was seen on Pot Creek about 20 miles southeast of Taos, at about 7,800 feet, and on August 23, 1919, a single young one only able to fly a short distance was seen at the head of a rough canyon of the Black Range about thirty miles southwest of Chloride at about 7,500 feet (Ligon). On May 27, 1922, a pair was seen about 18 miles west of Santa Fe acting as if they might be nesting in a large pile of bowlders broken off from the rimrock. In May, 1916, others were found working in some caves, about 10 miles west of Cuchillo, apparently "an old nesting site, from the general appearance of things" (Ligon MS.). In the Pecos Valley between Roswell and Fort Sumner, June 16-21, 1918, they were rather common, many being seen about the rough rims of the mesa along the east side of the river, but there was no time to look for nests. On July 10, 1919, at 10,500 feet, five miles north of Cowles, two were seen, and July 18, 1919, at 10,000 feet on the Hamilton Mesa, at a dead cow, one was seen. May 6-10, 1920, between Silver City and Mexico they were observed daily but were not common. May 27-June 22, 1924, they were observed most commonly along the rim of the Staked Plains, especially east of Carlsbad (Ligon).]

In the fall the birds range regularly a little higher than in summer, during their soaring flights mounting to very high altitudes. August 10 and 29, 1913, a few were seen near Koehler Junction, Colfax County (Kalmbach). The larger part leave northern New Mexico in September, and the last were seen—San Juan Mountains, one at 10,000 feet September 7, 1904 (Bailey); [two miles north of Monticello, September 8, 1917, 50 seen circling over a carcass; September 12, 1916, they were "very abundant along the railroad between Carlsbad, New Mexico and Pecos, Texas; on the 16th, very abundant along the railroad between El Paso and Sierra Blanca, Texas" (Ligon MS); and September 9, 1916, noted 12 miles northwest of Gallup (Skinner)]; in the Jicarilla Mountains, noted September 25, 1903 (Gaut); near Taos, September 30, 1903 (Bailey); Gallup, several September 29, 1908 (Birdseye). In the southern part of the State, they remain later; several were noted in the Mogollon Mountains, October 31, 1908 (Goldman); and one at Carri-zozo, October 31, 1902 (Gaut). Occasionally the species remains much later even in northern New Mexico and two were still present November 10, 1908, near Ship-rock (Birdseye).

It is quite probable that in mild winters a few occur in the State all winter, as they usually do in southeastern Arizona. Near Mesilla Professor Merrill noted them throughout the year except very late in December and January. On the Carlsbad Bird Reserve in January, 1915, they were seen once or twice, and on the Rio Grande Bird Reserve (Elephant Butte), November 23-December 9, 1916, one was seen (Willett).]

The arrival of the first was noted near Silver City, April 13, 1835 (Thwaite), and at Halls Peak, April 20, 1895 (Barber), though they had of course come earlier in the lower districts, arriving at Silver City about March 25 (Hunn) and in the [Carlsbad caves region, March 24, 1924, becoming common during the first half of April (Bailey)].—W. W. COOKE.

EGGS.—Laid on the bare ground often between or under rocks, or in a hollow log, stump, or tree; usually 2, white, creamy, or greenish white, generally spotted and blotched with brown and lavender, especially about the larger end.

FOOD.—Principally carrion but also snakes, toads, rats, mice, and occasionally young birds.

GENERAL HABITS.—In the days of the early explorers, before the prevalence of guns, Mr. Henshaw found the Indians using vulture quills to feather their arrows. At this time, Doctor Heermann tells us, the Turkey Vulture was seen on the desert, where it found "an ample supply of food from the carcasses of the numerous animals perishing from fatigue or the want of grass or water, and whose whitened bones strewn over the ground marked both the road and the hardships of the western pioneer" (1859, pp. 29–30). In the Carlsbad caves region in 1924, a dry winter and scanty forage for stock had resulted in an ample food supply of cattle and burros in the canyons. A colt that had been killed and partly eaten by a mountain lion was found by Mr. Bailey surrounded by a band of the carrion eaters. Except on the rare occasions when the Vultures are seen standing red-headed on the ground about the bones of some dead animal, we forget what we owe them as scavengers, for they are generally seen circling around high in the sky on outspread gray-bordered wings. In Chama Canyon we once saw a flock of twenty or thirty circling around high above us. At Dulce a gray-headed young one was discovered sitting on the fence near camp, perhaps attracted by our specimens—prairie dog, badger, coyote, and lynx—laid out to dry in front of the tent. They visit traps put out for bears, Mr. Ligon says, though how they find them is still a much discussed question.

Another disputed matter Doctor Wetmore settles authoritatively, saying—"Reports that this bird is responsible for dissemination of diseases among domestic stock are wholly without foundation and it should be protected as a useful species" (1927b, pp. 319–320).

About Mesilla Professor Merrill occasionally saw one of the great birds perched upon a tall yucca, and in the tornillo stretches perched on solitary cottonwoods (MS). At Lake Burford Doctor Wetmore found the Vultures fairly common, often soaring above the hills or about the broad sandstone ledges in the canyon below. One day he saw six pairs of these huge birds walking about on a rocky beach where apparently they were looking for the dead axolotls (mud puppies) often washed up by the waves. Two walked solemnly down to the water's edge and drank, dipping in the water and then raising the head in order to swallow. They clambered over the piles of Potamogeton and algae cast up the previous year and left on the shore, "pecking at it experimentally, pulling off the surface and digging into the interior with their bills as they would into carrion. One, suddenly feeling the warm sun, extended its wings and spread its tail, remaining thus for several minutes" (1920a, pp. 397–398).

On cold windy evenings at the Carlsbad caves, Mr. Bailey found large numbers, sometimes perhaps two or three hundred, gathered,

"settling on the rocks or grounds or in low trees in some spot sheltered from the wind, and where they would catch the first warm rays of the morning sun. They would not leave the roosting spot until well warmed, and at eight or nine o'clock might be seen sitting with wide-spread wings catching all the sun within reach" (1928a, p. 136). A pair of Vultures watched by Mr. Kempton, on reaching Indiana the middle of March, used their nest ground to roost in during the cold wet spring. The last of April he found them preparing their nest, "by pulling at the dry rotten wood on the side walls of the cavity with their beaks. When a large piece came loose the female would hold it down with one foot and tear it into small bits, which she spread about on the floor, where the eggs were to be deposited. The interested male bird was a hindrance in nest making, and every now and then the female placed her head under his breast and pushed him out of the way. Once he tumbled out of the tree. However, undaunted, he clambered back keeping his head down, so that his mate could not repeat her attack and more in the way than before" (1927, p. 143).

When surprised at the nest the Vulture sometimes hisses at the intruder. At times it also gives "a subdued croak."

ADDITIONAL LITERATURE.—HOPKINS, C. L., Auk, V, 248-251, 1888.—KEMPTON, R. M., Wilson Bull., XXXIX, 142-145, 1927.—SAYLES, IRA, Auk, IV, 51-56, 1887 (sense of smell).—TYLER, J. G., Pacific Coast Avifauna, 9, 37-39, October 1, 1913.

HAWKS, EAGLES, KITES, etc. Family Accipitridae

The twenty-two North American species of Accipitridae show much diversity of form and habit. The *Kites*, which make long sustained flights, have long wings and short legs; the *Accipiters*, which make quick darting flights, have short wings, long legs and long tails; the *Buteos*, or Buzzards, which make "strong but measured flights" and often soar in circles, have heavy forms, long broad wings, and broad tails. Most of the hawks are of great economic value, living largely on small mammals. Their importance in removing game birds suffering from contagious diseases is also well understood (Preble). Their cries are "generally loud, startling, and characteristic of their fierce natures. They strike their prey with their feet, and use the bill to tear it into fragments" (Chapman). Their nests are usually bulky, and made of sticks.

REFERENCES.—FERGUSON, A. L. and H. L., Auk, XXXIX, 488-496, 1922 (migration).—HAUSMAN, L. A., N. J. Agr. Exper. Station, Bull. 439, 1927 (economic relations).—PREBLE, E. A., A Plea for our Hawks, Nature Magazine, January, 1927.—SETON-THOMPSON, ERNEST, Bird-Lore, III, 189, 1901 (recognition marks).

Subfamily Perninae

SWALLOW-TAILED KITE: *Elanoides forficatus* (Linnaeus)

DESCRIPTION.—*Length*: 19.5-25.5 inches, wing 15.4-17.7, *outer tail feathers* 12.5-14.5, bill .7-.8, tarsus 1-1.3. Wings long, slender, acute, two quills cut out on inner webs, *tail deeply forked*; legs short and stout. *Adults*: Head, neck, band

on rump, and *underparts*, including wing linings, *white*; *back, tail, and wings black* with gray bloom, or bronzy purple gloss; iris black or very dark, bill bluish black, cere, edges of bill, and feet pale bluish, feet tinged with green. *Immature*: Similar but less lustrous, more brownish above, feathers of wings and tail tipped with white, and of head and neck with blackish shaft lines.

RANGE.—North temperate North America, east of Rocky Mountains south to south temperate South America. Breeds locally from Minnesota, Wisconsin, Indiana, and South Carolina south through eastern Mexico and Central America to Argentina and Peru; winters chiefly in Central and South America; casual or accidental in New Mexico, Colorado, southern Saskatchewan, Manitoba, north-eastern States, and Greater Antilles; recorded from British Isles.

STATE RECORDS.—A Swallow-tailed Kite was taken August 5 at Cantonment Burgwyn about 1859 and sent to the United States National Museum. Another was seen July 10, 1903, high up on the southwestern slope of the Capitan Mountains at about 9,500 feet (Gaut). On the Carlsbad Bird Reserve one was taken about 1907 (Willett). These were, of course, wanderers from the regular range far to the eastward in eastern Oklahoma or eastern Texas.—W. W. COOKE.

NEST.—"Usually in great woods" (Forbush), in the tops of high trees near water; made of sticks lined with gray or green moss. *Eggs*: Generally 2, white or buffy white, sparsely or boldly spotted or blotched, chiefly around the larger end, with brown.

The Swallow-tailed Kite lives mainly on the wing and stragglers have been seen in many of the northern States and even in distant England.

Subfamily Milvinae

MISSISSIPPI KITE: *Ictinia mississippiensis* (Wilson)

DESCRIPTION.—*Length*: 13–15.5 inches, wing 10.6–12.3, tail 6–7. Two quills cut out on inner webs. *Adults*: Head and wing band grayish white; *upperparts bluish slate*, with *square black tail* and black wing quills webbed with reddish brown; *underparts dark gray*; iris lake red; lores, eyelids, cere and bill, black, gape of mouth, legs, and feet orange. *Young*: Head, neck and underparts white, longitudinally spotted or striped, except on throat, with dark brown or reddish brown; upperparts blackish, feathers edged with brown, gray, or white; tail black, with about three ashy bands; wing quills black tipped with white, and without rufous.

RANGE.—Breeds chiefly in Lower Austral Zone from southern Kansas, southern Indiana, and South Carolina south to Florida and Texas, but in the Mississippi Valley as far north as Illinois; winters in southern Texas and Florida and rarely south to Guatemala.

STATE RECORDS.—Evidence of the occurrence of this species in New Mexico rests solely on specimens taken by Woodhouse. In Volume IX of the Pacific Railroad Reports, 1858, p. 37, John Cassin includes New Mexico on the authority of Woodhouse, in the range of the species. In 1860, in a letter published in the Ibis (pp. 103, 104), Cassin, in enumerating the specimens of this species in the collection of the Academy of Natural Sciences of Philadelphia, makes this statement: "Three of these (♂♂ et juv.), are from New Mexico, obtained by Dr. Woodhouse." They were probably taken in the Canadian River section of the northeastern part of the State. This is the only record and probably represents wandering birds from the Texas part of the Canadian River, where they have been found nesting, or from their normal home in the lower Mississippi Valley.—W. W. COOKE.

GENERAL HABITS.—Though not an oceanic wanderer like its large handsome relative, the Swallow-tailed Kite, the Mississippi Kite is

also a remarkable aeronaut, and it is not surprising to find it on occasion far from its breeding grounds.

In eastern Kansas Doctor Wetmore found a flock of a dozen feeding on cicadas. As he describes it—"They hunted back and forth in long circles, soaring and turning, hardly ever getting very far from the earth. Occasionally one swooped down over the brush, and captured an insect, and sailed off eating it while flying. We never saw the birds in trees during our whole stay, but always on the wing" (1909, p. 157).

HAWKS: Subfamily Accipitrinae

"The Accipitrine Hawks are woodland birds that beat about the tree tops or along the edges of the woods; they do not habitually soar high in the open. They take their prey by surprise and quick attack rather than by open pursuit" (Taverner).

WESTERN GOSHAWK: *Ástur atricapillus striatulus* Ridgway

PLATES 9 AND 10

DESCRIPTION.—*Male*: Length 22 inches, wing 12-13.2, tail 9.5-10.5, tarsus 2.7-3.5. *Female*: Length 24.5 inches, wing 13.5-14.2, tail 11.5-12.7. *Leg feathered about half way down in front.* *Adults*: Upperparts dark bluish gray, the back inclining to sooty blackish with black shaft streaks; top of head blackish, a whitish stripe over the eyes, a black stripe over the ears and occiput with bases of feathers cottony white; wings barred, wing linings reddish white, spotted with rufous, under surface of quills mainly barred; underparts whitish covered with very finely and densely penciled gray zigzags giving effect of bluish gray surface, marked with black shaft streaks; iris red in male, brownish orange in female; bill dark bluish, cere and feet yellow. *Young*: Upperparts brownish black, with buffy and rusty streakings and edgings; underparts with broad black streaks, the thighs with cordate spots; underside of wings and tail barred; iris yellow, bill brownish, cere and feet duller yellow.

COMPARISONS.—The three "injurious" short winged, long-legged, hawks grade in size from the Sharp-shinned to the Goshawk, but when very large females can not surely be distinguished by measurements, the Goshawk can be known by the greater feathering of the leg (over instead of under one-half as in the Cooper and Sharp-shinned), while the Cooper can be recognized by its rounded tail, the Sharp-shinned by its square (even or slightly emarginate) tail. (See Plate 10.)

RANGE.—Breeds from Cook Inlet, Alaska, south to Sierra Nevada in latitude 36° 30', and through Rocky Mountains to northwestern Mexico; winters southward in California and east to Colorado.

STATE RECORDS.—A male Western Goshawk was collected at Tres Piedras July 13, 1892 (Loring), and one was identified late in July, 1905, near Agua Fria in the Zuni Mountains (Hollister). It is not certain that either of these birds had nested in New Mexico for this species nests early and the young would normally have been fledged before the first of June. [They probably nest in the high mountains east of Taos. On April 19, 1919, one was seen at the G. O. S. Ranch about 35 miles northeast of Silver City, at about 7,500 feet (Ligon).]

In early fall the species becomes not uncommon in the mountains of the northern half of the State and ranges south to the Sacramento Mountains—Cloudercroft September 6, 1902 (Bailey)—the San Mateo Mountains near Laguna August 17, 1905 (Hollister); [Black Range, 15 miles northwest of Pinos Altos, September 5, 1918 (Ligon); Silver City (20 miles east), specimens taken November 2, 1917 (Kellogg)],



MAINLY INJURED HAWKS

SHARP-SHINNED HAWK
WESTERN GOSHAWK

COOPER HAWK
IMMATURE
ADULT

also a remarkable aeronaut, and it is not surprising to find it on occasion far from its breeding grounds.

In eastern Kansas Doctor Wetmore found a flock of a dozen feeding on cicadas. As he describes it—"They hunted back and forth in long circles, soaring and turning, hardly ever getting very far from the earth. Occasionally one swooped down over the brush, and captured an insect, and sailed off eating it while flying. We never saw the birds in trees during our whole stay, but always on the wing" (1909, p. 157).

HAWKS: Subfamily Accipitrinae

"The Accipitrine Hawks are woodland birds that beat about the tree tops or along the edges of the woods; they do not habitually soar high in the open. They take their prey by surprise and quick attack rather than by open pursuit" (Taverner).

WESTERN GOSHAWK: *Ástur atricapillus striatulus* Ridgway

PLATES 9 AND 10

DESCRIPTION.—*Male:* Length 22 inches, wing 12-13.2, tail 9.5-10.5, tarsus 2.7-3.5. *Female:* Length 24.5 inches, wing 13.5-14.2, tail 11.5-12.7. *Leg feathered about half way down in front.* *Adults:* Upperparts dark bluish gray, iris dark, sometimes sooty blackish with black shaft streaks; top of head blackish, a whitish stripe over the eyes, a black stripe over the ears and occiput with bases of feathers cottony white; wings barred, wing linings reddish white, spotted with rufous, under surface of quills mainly barred; underparts whitish covered with very finely and densely penciled gray zigzags giving effect of bluish gray surface, marked with black shaft streaks; iris red in male, brownish orange in female; bill dark bluish, cere and feet yellow. *Young:* Upperparts brownish black, with buffy and rusty streakings and edgings; underparts with broad black-streaks, the thighs with cordate spots; underside of wings and tail barred; iris yellow, bill brownish, cere and feet duller yellow.

COMPARISONS.—The three "injurious" short winged, long-legged, hawks grade in size from the Sharp-shinned to the Goshawk and would not be large females can not surely be distinguished by measurements, the Goshawk can be known by the greater feathering of the leg (over instead of under one-half as in the Cooper and Sharp-shinned), while the Cooper can be recognized by its rounded and not emarginate tail by its square (even or slightly emarginate) tail. (See Plate 10.)

RANGE.—Breeds from Cook Inlet, Alaska, south to Sierra Nevada in latitude 36° 30', and through Rocky Mountains to northwestern Mexico; winters southward in California and east to Colorado.

STATE RECORDS.—A male Western Goshawk was collected at Tres Piedras July 13, 1892 (Loring), and one was identified late in July, 1905, near Agua Fria in the Zuni Mountains (Hollister). It is not certain that either of these birds had nested in New Mexico for this species nests early and the young would normally have been fledged before the first of June. [They probably nest in the high mountains east of Taos. On April 19, 1919, one was seen at the G. O. S. Ranch about 35 miles northeast of Silver City, at about 7,500 feet (Ligon).]

In early fall the species becomes not uncommon in the mountains of the northern half of the State and ranges south to the Sacramento Mountains—Cloudcroft September 6, 1902 (Bailey)—the San Mateo Mountains near Laguna August 17, 1905 (Hollister); [Black Range, 15 miles northwest of Pinos Altos, September 1, 1918 (Ligon); Silver City (20 miles east), specimens taken November 2, 1917 (Kellogg)],



MAINLY INJURIOUS HAWKS

SHARP-SHINNED HAWK

WESTERN GOSHAWK

COOPER HAWK
IMMATURE

ADULT

where two were known to winter (Hunn); and even to the lower part of the Gila Valley where one was seen near Alma October 15, 1906 (Bailey). One was seen near Las Vegas January 9, March 7, and March 27, 1898 (Mitchell). [One or two were also seen on the Rio Grande Bird Reserve, November 23–December 9, 1916 (Willett).] —W. W. COOKE.

NEST.—In high trees made of sticks lined with juniper or other bark, grass, tree moss, weed stalks, and pine needles. *Eggs*: 3 to 5, bluish white, unspotted.

FOOD.—Largely birds, including poultry and game birds. Also rock squirrels.

GENERAL HABITS.—The Goshawk, the largest of the three destructive hawks, kills poultry and small game of all kinds, and breeds in suitable localities where food is plenty. "During spring and summer," Major Bendire said, "it is seldom seen in the more open districts, though it is abundant enough later on, when the heavy snows drive the game into the foothills and lower valleys" (1892, p. 199).

In September and October, Mr. Ligon reported of the Western Goshawk, "these grouse exterminators occur in the mountains." In the high mountains east of Taos, he has found them very destructive to the game. In the Black Range he saw "a fine specimen carrying a rock squirrel"; and finding the remains of some Band-tailed Pigeons, surmised that the Goshawks were the guilty ones (MS).

In ordinary years the game birds suffer enough from these predatory birds, but as Doctor Wetmore states in his interesting book on the Migrations of Birds, from the north "at irregular intervals come great flights of Goshawks that spread across the entire northern half of the United States and penetrate south to California and New Mexico." These periodic invasions of Goshawks and Snowy Owls seem to come during years when epidemics have destroyed the northern hares upon which they feed (1926a, pp. 94–96).

ADDITIONAL LITERATURE.—BREWSTER, WILLIAM, Bull. Mus. Comp. Zool., Harvard College, LXVI, 321–324, 1925.—CAMERON, E. S., Auk, XXIV, 260–262, and Plate X, 1907.—SUTTON, G. M., Wilson Bull., XXXVII, 193–199, 1925.—THAYER, G. H., Concealing-Coloration of Animals, 80–81, 1909.

SHARP-SHINNED HAWK: *Accipiter velox* (Wilson)

PLATES 9 AND 10

DESCRIPTION.—*Male*: Length 10–11.5 inches, wing 6.1–7.1, tail 5.8–6.1, tarsus 1.9–2. *Female*: Length 12.5–14 inches, wing 7.8–8.8, tail 6.6–8.2. Head small, wing short, rounded tail and legs long, leg feathered a third of the way down in front, wings with three to five outer quills cut out on inner webs, tail square cornered. *Adults*: Upperparts (including wings) bluish gray, occipital feathers snow-white under surface, tail with three or four narrow blackish bands, and narrow white tip; underparts white, heavily cross-banded or spotted with reddish brown; wing linings white, with dusky spots; flight feathers and axillars barred; iris varying with age from yellow to red; bill dark, cere, legs, and feet yellow or greenish. *Young in juvenal plumage*: Above brown, varied with rusty and white; below whitish, streaked vertically with reddish brown.

COMPARISONS.—Somewhat longer and slimmer than Sparrow Hawk or Pigeon Hawk with which it is sometimes confounded; tail longer, wings shorter, more rounded. Flight an alternation of quick wing beats and sailing (Forbush). (See pp. 192, 193, and Plate 11.)

RANGE.—North and Middle America. Breeds throughout most of United States and Canada from northwestern Alaska, northwestern Mackenzie, central Manitoba, northern Ontario to Newfoundland south to Florida, the Gulf coast, Texas, New Mexico, and Arizona; winters from southeastern Alaska, southern British Columbia, western Montana, southern Nebraska, Illinois, and southern Ontario to Maine south to Guatemala and (casually) to Panama.

STATE RECORDS.—The male Sharp-shinned Hawk taken June 22, 1909, at 9,000 feet on Mount Sedgwick (Goldman) was undoubtedly breeding and the same is probably true both of the one seen July 8, 1894, in the Pinos Altos near Silver City (Fisher), and the one taken late in July, 1909, in the Sacramento Mountains near Clouderoft (Green); one was also taken June 26, 1892, on the east side of the San Luis Mountains, just over the New Mexico line in Chihuahua (Mearns). [They are observed sparingly in New Mexico in summer, though no nests were located, 1916–1918. On June 22, 1919, two, which were very likely breeding birds, were seen on Pot Creek southeast of Taos, 7,500–8,000 feet. On May 8, 1920, one was seen on top of the Animas Mountains (Ligon). At Lake Burford, May 23–June 19, 1918, they were nesting in small numbers (Wetmore). In Santa Fe Canyon, they were seen twice in the nesting season (Jensen, 1922).]

The species is evidently rare in summer in the State but becomes common in fall migration as shown by the following dates: Sierra Grande above 8,000 feet, August 14, 1903 (Howell); Red River near the Hondo at 8,400 feet, August 15, 1904, and Santa Clara Canyon, August 24, 1906 (Bailey); and Beaver Lake, August 26, 1908 (Birdseye). During the migration it ranges at least to 10,000 feet—San Juan Mountains September 9, 1904 (Bailey), and Mogollon Mountains about October 25, 1908 (Goldman), occurring also in the lower parts of the State at Gila, Lake Valley, and Las Cruces, though most common at this season between 6,000 and 9,000 feet, where the small birds on which it feeds are found most abundantly. One was taken at about 6,000 feet near Koehler Junction, Colfax County, October 21, 1913 (Kalmbach).

In winter it is common (Ligon). One was shot December 21, 1900, at Tijeras (Birtwell); one late in January, 1894, at San Marcial (Loring); one was reported December 25, 1902, at Albuquerque (Harman); they were common in the Guadalupe Mountains south of Queen, December 31, 1915 (Ligon); and taken at Silver City, February 13, 1916 (Kellogg); but the majority leave the State in late October or November and return in early March. The last seen at Chloride in the spring was April 25, 1915 (Ligon).—W. W. COOKE.

NEST.—A remodeled one of crow, magpie, or squirrel; or if new, made of sticks, usually sparsely lined with inner bark or green leaves, preferably in a conifer. Eggs: 4 or 5, bluish or greenish white, fading to grayish white, variably spotted and blotched with brown, sometimes almost entirely covered.

FOOD.—Mainly birds, but also young chickens, and rarely mice and grasshoppers. Of 107 stomachs examined, 103 contained the remains of birds. An immature bird, apparently still being fed by its mother, when shot in Santa Clara Canyon had its crop full of small lizards (*Scaloporus*), while its gizzard contained the feet, bill, and feathers of a Pygmy Nuthatch, a lizard, and one large caterpillar (Bailey).

GENERAL HABITS.—The Long-tailed Accipiters capture their prey, as Doctor Fisher, in his Hawk and Owl Bulletin, describes it, mainly by "quick turns and rapid dashes from cover, the victim being grasped

before the hawk's presence is really suspected." While most of the hawks and owls are of great agricultural value, the Sharp-shinned, the Cooper, and the Goshawk are almost wholly injurious, destroying poultry, game, and insectivorous birds. So great are their depredations that Doctor Fisher considers the three marauders responsible for "the unjust hatred and suspicion" with which our birds of prey as a whole are regarded (1907, p. 17).

In the fall migration in New Mexico, Mr. Ligon finds, the Sharp-shins keep along with the migration of the small birds (MS). In the Chama River Valley in fall when one of the Hawks darted around a small tree ahead of us, a surprised Western Robin flew screaming out. In the Gallinas Mountains, where we found a number of Sharp-shins, one was seen flying around the top of a tall pine into which a flock of small birds had just flown. In the Black Range, Mr. Ligon in passing a pine-covered ridge saw a Sharp-shin make repeated, unsuccessful dives at the sparrows flying from the grass to the brush of the ridge. Taking alarm, many of the flock hid themselves by squatting in the grass until their enemy had gone, when they flew boldly up into a dead pine high on the ridge. Once when hearing a great commotion among the Pygmy Nuthatches in a canyon, Mr. Ligon discovered a Sharp-shin carrying off one of the Pygmies (MS), and the marauders are often seen flying high, carrying small birds in their claws. In Montana, on Mr. Cameron's ranch in September, one of the little Hawks "kept all the birds away which were accustomed to come to the cattle troughs. It would dash at the flocks of crossbills and the other birds with tremendous velocity, scattering them in all directions." As if for sport, it would strike at fowls weighing four pounds "sending them screeching and flying for shelter," and would also chase its small quarry to cover without attempting to capture it (1907, p. 260).

In the Manzano Mountains in October, 1903, Mr. Gaut found these Hawks frequenting the mountain springs and streams to capture small birds, and the stomachs of all those taken contained birds. Red-bellied Nuthatches and Ruby-crowned Kinglets seemed to suffer the most, but Long-crested Jays and Clark Nutcrackers were also occasionally captured (MS). The large birds do not all meekly submit to the freebooter, however. A Nutcracker was the aggressor in an attack witnessed by Major Goldman at 9,500 feet in the San Mateo Mountains. As the Sharp-shin flew out of a Douglas spruce, the Nutcracker darted down at him from above getting so close that the small Hawk ignominiously dodged. Not content with this, the Nutcracker followed the freebooter for some hundred yards, when he calmly turned off, letting it pass out of sight (MS).

In the east, great numbers of Sharp-shins follow the autumn flights of small birds across Lake Erie. Once when watched by Saunders

and Taverner, a hundred and thirty-three started across the lake in half an hour. Still greater migration flights have been recorded from Cape May, New Jersey, where the birds gather before crossing Delaware Bay. In 1920, Dr. Witmer Stone reports, in one week no less than fourteen hundred were killed by gunners for food (1922, p. 567).

This seems like carrying their destruction too far, for after all, as Mr. McAtee points out, both the Cooper and the Sharp-shin "have a tendency to keep the fruit and grain-eating birds from becoming too numerous."

ADDITIONAL LITERATURE.—FORBUSH, E. H., Educational Leaflet 37, Nat. Assoc. Audubon Soc.—RUST, H. J., Condor, XVI, 14-24, 1914.

COOPER HAWK: *Accipiter coöperi* (Bonaparte)

PLATES 9 and 10

DESCRIPTION.—*Male*: Length 14-17 inches, wing 8.8-9.4, tail 7.8-8.3, tarsus 2.3-2.6. *Female*: Length 18-20 inches, wing 10.1-11, tail 9-10.5, tarsus 2.6-2.8. Five quills cut out on inner webs. *Adults*: Like the Sharp-shin but larger, tail rounded, and top of head blackish in contrast to bluish gray of back.

RANGE.—Breeds mainly in Canadian Zone from southern Alaska, southern British Columbia, central Alberta, northern Manitoba, southern Ontario, southern Quebec, and Prince Edward Island south to southern border of United States from Florida to California, and into Mexico; winters from northern Oregon, Colorado, Nebraska, southern Ontario, and southern Maine south to Costa Rica.

STATE RECORDS.—Although few Cooper Hawk eggs have yet been recorded from New Mexico, the birds are common in the wooded mountain areas, nesting in the watered canyons, as those about Chloride and Hermosa that run east, and also on the tributaries of the Gila River, generally laying the first week in May (Ligon 1916-1918). Eggs were taken May 4, 1885, at Kingston (Norris); May 26, 1913, on Beaver Creek, and other nests found at 6,400-6,500 feet near Chloride; [a nest with one egg, May 13, 1916, on Mineral Creek three miles west of Chloride; one with eggs, May 21, 1920, and one with downy young, June 29, 1920, also near Chloride at about 6,500 feet; one with four half-feathered young June 28, 1916, in a nest about 35 miles northeast of Grant. Another nest was found at 7,500 feet in the bed of a dry canyon north of Mount Taylor (Ligon).] It seems probable that birds [taken May 6, 1920, near Walnut Wells (Ligon), seen May 26, 1918, at Lake Burford (Wetmore)], noted June 1, 1884, at Silver City (Marsh), and July 4, 1903, near Pecos (Bailey), and those collected in the San Luis Mountains in 1892—where one was taken July 13 and another June 24 both on the west side (Mearns)—were all nesting in their respective neighborhoods. [At Silver City they are common and a breeding female was taken June 17, 1925 (Kellogg). In northern Santa Fe County they are common in early spring and a few remain during the nesting season (Jensen, 1922).] They are said to breed in San Miguel County (Mitchell), and the breeding range probably extends from 6,000 to 9,000 feet altitude.

In the fall one was seen near Koehler Junction, on September 11, 1913 (Kalmbach); one was seen in the Guadalupe Mountains on August 8, 1901, at 6,200 feet (Bailey); and a pair near the summit of the Capitan Mountains August 16, 1903 (Gaut); [it was taken at Silver City, September 1, 1916 (Kellogg)]; while a little later, September 6, 1906, one was noted at 11,000 feet in the Jemez Mountains on Pelado Peak (Bailey). The above localities probably represent about the extremes of the

vertical range of the species in the State and within these limits it occurs over most of the State during migration.

It winters up to about 7,000 feet (Mitchell). In the Guadalupe Mountains at an altitude of 6,500 feet, it was seen January 13, 1915, [on the Carlsbad Reserve it was noted in December, 1916, and also on the Rio Grande Bird Reserve (Elephant Butte), between November 23 and December 9, 1916 (Willett)].—W. W. COOKE.

NEST.—Often a remodeled one of hawks, crows, or squirrels in such trees as cottonwood, box elder, oak, walnut, pine, and Douglas fir, bulky, made of sticks often lined with rough outer bark, and sometimes moss, grass, or leaves. *Eggs*: Usually 4 or 5, pale bluish or greenish white, unmarked or faintly and irregularly scrawled with brown or pale buffy.

FOOD.—Almost entirely wild birds and poultry, including doves, game birds, and sparrows.

GENERAL HABITS.—In his Hawk and Owl Bulletin, Doctor Fisher says, the Cooper Hawk, which is a larger counterpart of the Sharpshinned, is "preeminently a Chicken Hawk, and is by far the most destructive species we have to contend with." It is "strong enough to carry away a good-sized chicken, grouse, or cottontail rabbit" (1907, p. 17).

In the Mesilla country, Professor Merrill reported, they may be seen "on the mesa, perched on yuccas or hawking over. In the winter they come up on the college grounds chasing sparrows" (MS).

The characteristic notes, Mr. Forbush gives as "*cac cac cac* or *cuck cuck cuck* often repeated."

ADDITIONAL LITERATURE.—JOB, H. K., *Wild Wings*, 276-278, 1905.

BUZZARD HAWKS and EAGLES: Subfamily Buteoninae

WESTERN RED-TAIL: *Buteo borealis calurus* Cassin

PLATES 9 AND 11

DESCRIPTION.—*Male*: Length about 19-22.5 inches, wing 13.5-16.5, tail 8.5-10, bill .9-1, tarsus 2.4-3.2. *Female*: Length 23-25 inches, wing 15.2-17.7, tail 9.5-10.5, bill 1-1.1, tarsus 3.1-3.4. Wings with *four quills cut out* on inner webs. Dark *wrist-spot* of the Buteos (Seton-Thompson, 1901, pp. 188-189) *on underside of wing in all plumages*. *Adults*: Varying from light to very dark or melanistic. *Light extreme*: Upperparts dark brown, marked with lighter brown and whitish, *tail bright reddish brown with a black subterminal band* and sometimes additional bars; underparts white or buffy, streaked. *Dark extreme*: Uniform sooty brown except for rufous tail. *Intermediates*: Reddish brown on underparts with wash on upperparts; all grades between these three plumages are also found. Iris brown, bill horn color, cere, legs and feet, yellow. *Young*: Dark brown, heavily spotted on lower underparts, sometimes wholly dusky; tail grayish to yellowish brown, crossed by 9 to 10 blackish bands, iris yellow. (For comparisons, see Swainson Hawk, p. 167.)

RANGE.—Western North America from middle Yukon and central-western Mackenzie to western part of Great Plains and south to Cape San Lucas and Guatemala; in winter migrates from the northern half of its range. Has wandered to Arkansas, etc.

STATE RECORDS.—The type specimen of the Western Red-tail was obtained by Henry near Fort Webster about 1855. The species occurs throughout the mountainous portion of the State, nesting at the middle altitudes. A nest found June 3, 1903, at Santa Rosa, was only just built, while in a nest found at about 6,500 feet on the Rio Mimbres the young left late in May, 1906 (Bailey), and a cliff nest near Beaver Lake, at 7,000 feet, already held slightly incubated eggs April 14, 1913 (Ligon). [In the Carlsbad cave region it is perhaps the commonest breeding hawk along the cliffs and canyon walls, where bulky stick nests are often seen (Bailey). In a cliff nest 10 miles west of Cuchillo, at about 5,500 feet, partly feathered young were found May 15, 1916; and "pretty well feathered young," June 28, in a pine tree nest about 45 miles northeast of Grants, at 7,500 feet (Ligon).] A nest was found in a gulch near Fort Wingate in the summer of 1905 (Hollister), and the species is a common breeding bird along the Rio Grande at Mesilla (Merrill). In May and June, during the nesting season, it has been noted from 3,800 feet at Mesilla to about 5,000 feet along the east base of the Capitan Mountains (Bailey), and to about 9,000 feet near the summit of the Zuni Mountains (Goldman). [In northern Santa Fe County it nests at least up to 9,000 feet (Jensen, 1922). At Lake Burford, one or two nests were seen in the canyon below the lake and individuals noted, May 26–June 14, 1918 (Wetmore). In the latter part of June, 1919, they were seen almost daily between Pot Creek and Rio Chiquito, 20 miles southeast of Taos, at 9,000 feet; also seen almost daily from July 10–18, 1919, at the head of the Pecos at about 10,000 feet. In both localities there were apparently young birds, but none were seen (Ligon).]

After the young are fledged both old and young range over the entire State from the lowlands to the summits of the highest peaks; in fact on October 7, 1903, one was seen sailing high above Wheeler Peak, the highest point in New Mexico (Bailey). On September 24, 1913, one was seen near Koehler Junction (Kalmbach). [In 1916 the species was noted September 29 and 30, in the region of Gallup; October 1, at White Water Creek, and October 4, near Zuni (Skinner).]

It is much less common in winter than in summer and at this season is confined to the lower levels. A few were noted at Fort Thorn on the Rio Grande (Henry); and they are regular winter residents at Mesilla (Merrill); only three were seen during the entire winter of 1903–4 at Arroyo Seco (Surber); two were seen January 4, 1903, near Jarilla (Gaut); at Silver City one was seen December 29, 1883, and no more until February 5, 1884 (Marsh); [taken there November 18, 1917 (Kellogg)]. In the region of the Carlsbad Bird Reserve it was common January, 1915; it was also noted in the winter of 1915–16, [and was rather common December, 1916. On the Rio Grande Bird Reserve (Elephant Butte), it was noted November 23–December 9, 1916 (Willett)].—W. W. COOKE.

NEST.—Usually in large cottonwoods, sycamores, and live oaks, 30 to 50 feet from the ground, but also in pines, junipers, mesquites, ocotillas, and giant cactus, and occasionally on cliffs; made of sticks and lined with roots and inner bark. *Eggs*: Generally 2 or 3, creamy or bluish white, unspotted or irregularly blotched with yellow and brown.

FOOD.—Mainly ground squirrels, rock squirrels, chipmunks, prairie dogs, cottontail and jack rabbits, mice, snakes—including rattlesnakes—lizards, frogs, cattle grubs, grasshoppers, Jerusalem crickets, and other insects. One shot in Santa Clara Canyon when eating a ground squirrel had part of the squirrel in its crop, with several enormous beetles and the remains of an Abert squirrel in its stomach (Bailey).



SPARROW HAWK

ROUGH-LEG

INDIAN ROUGH-LEG

STATE RECORDS.—The type specimen of the Western Red-tail was obtained by Henry near Fort Webster about 1855. The species occurs throughout the mountainous portion of the State, nesting at the middle altitudes. A nest found June 3, 1903, at Santa Rosa, was only just built, while in a nest found at about 6,500 feet on the Rio Mimbres the young left late in May, 1906 (Bailey), and a cliff nest near Beaver Lake, at 7,000 feet, already held slightly incubated eggs April 14, 1913 (Ligon). [In the Carlsbad cave region it is perhaps the commonest breeding hawk along the cliffs and canyon walls, where bulky stick nests are often seen (Bailey). In a cliff nest 10 miles west of Cuchillo, at about 5,500 feet, partly feathered young were found May 15, 1916; and "pretty well feathered young," June 28, in a pine tree nest about 45 miles northeast of Grants, at 7,500 feet (Ligon).] A nest was found in a gulch near Fort Wingate in the summer of 1905 (Hollister), and the species is a common breeding bird along the Rio Grande at Mesilla (Merrill). In May and June, during the nesting season, it has been noted from 3,800 feet at Mesilla to about 5,000 feet along the east base of the Capitan Mountains (Bailey), and to about 9,000 feet near the summit of the Zuni Mountains (Goldman). [In northern Santa Fe County it nests at least up to 9,000 feet (Jensen, 1922). At Lake Burford, one or two nests were seen in the canyon below the lake and individuals noted, May 26–June 14, 1918 (Wetmore). In the latter part of June, 1919, they were seen almost daily between Pot Creek and Rio Chiquito, 20 miles southeast of Taos, at 9,000 feet; also seen almost daily from July 10–18, 1919, at the head of the Pecos at about 10,000 feet. In both localities there were apparently young birds, but none were seen (Ligon).]

After the young are fledged both old and young range over the entire State from the lowlands to the summits of the highest peaks; in fact on October 7, 1903, one was seen sailing high above Wheeler Peak, the highest point in New Mexico (Bailey). On September 24, 1913, one was seen near Koehler Junction (Kalmbach). [In 1916 the species was noted September 29 and 30, in the region of Gallup; October 1, at White Water Creek, and October 4, near Zuni (Skinner).]

It is much less common in winter than in summer and at this season is confined to the lower levels. A few were noted at Fort Thorn on the Rio Grande (Henry); and they are regular winter residents at Mesilla (Merrill). Only three were seen during the entire winter of 1903–4 at Arroyo Seco (Barber); two were seen January 4, 1903, near Jarilla (Gunn); at Santa Fe City one was seen December 29, 1903, and no more until February 5, 1904 (Marsh); taken here November 18, 1917 (Killing). In the region of the Carlsbad Bird Reserve it was common January, 1915; it was also noted in the winter of 1915–16, [and was rather common December, 1916. On the Rio Grande Bird Reserve (Elephant Butte), it was noted November 23–December 9, 1916 (Willett)].—W. W. COOKE.

NEST.—Usually in large cottonwoods, sycamores, and live oaks, 30 to 50 feet from the ground, but also in pines, junipers, mesquites, ocotillas, and giant cactus, and occasionally on cliffs; made of sticks and lined with roots and inner bark. **Eggs:** Generally 2 or 3, creamy or bluish white, unspotted or irregularly blotched with yellow and brown.

FOOD.—Mainly ground squirrels, rock squirrels, chipmunks, prairie dogs, cottontail and jack rabbits, mice, snakes—including rattlesnakes—lizards, frogs, cattle grubs, grasshoppers, Jerusalem crickets, and other insects. One shot in Santa Clara Canyon when eating a ground squirrel had part of the squirrel in its crop, with several enormous beetles and the remains of an Abert squirrel in its stomach (Bailey).



MAINLY BENEFICIAL HAWKS

SWAINSON HAWK

WESTERN RED-TAIL

DESERT SPARROW HAWK

FERRUGINOUS ROUGH-LEG

GENERAL HABITS.—The name Hen Hawk or Chicken Hawk, which is applied locally and indifferently to the Red-tail and other beneficial hawks, is responsible for much of the animus that deprives the rodent-plagued ranchman of his most efficient friends. Where individual hawks are destructive, they may easily be disposed of, but the aggregate amount of good a hawk does by destroying ranch pests throughout the year should not be forgotten when balancing debits and credits with these great sky-circlers, the delight of the field student, be he boy or man.

Hawk campaigns directed primarily against the injurious Cooper and Sharp-shinned Hawks, Mr. McAtee says, are a menace to the beneficial hawks, for the small swift, flying ones "rarely are seen by the ordinary observer while the larger, more slowly moving, and more beneficial Buteos are comparatively easy victims. Thus the result of a Hawk campaign is the maximum destruction of the more beneficial species, and minimum destruction of, and subsequent freedom of the field, for the more injurious types" (1926, pp. 542-544).

When Mr. Bailey and I were hunting over the juniper and nut pine ridges near Santa Rosa we saw two Red-tails circling in the sky, their fan-shaped red tails—whose feathers are used, as Mr. Jenson tells us, by the Pueblo Indians in their ceremonial dances—identifying them at a glance—and looking across to the top of the ridge ahead of us, in the highest juniper in sight we discovered a large black mass that proved to be their nest. It was about twenty feet from the ground, and on climbing to it Mr. Bailey found that it was made of oak, juniper, and pine branches, heavily lined with juniper bark, making a deep soft bed for the prospective eggs and young. A piece of cotton-tail lay conveniently on the side of the nest. One of the birds saw us at the nest and with complaining cries came straight toward us till close by, when it turned and circled overhead.

A Western Red-tail shot on the lower edge of the yellow pines in Santa Clara Canyon on August 31, when eating a ground squirrel, illustrated the gradual molt that enables most birds to fly during the process. The ten feathers of the tail presented strong contrasts in color. The old feathers—2d, 3rd, and 8th—were not only much abraded but greatly faded. The bright new feathers—1st, 4th, 6th, 7th, and 9th—were almost fully grown, the middle one already a trifle abraded at tip, showing the slowness of the molt. Two pinfeathers—5th and 10th—had recently replaced the old feathers so that during the growth of the new tail, half of the old had been left for use. In the wing the first four primaries were fresh, and there was one pinfeather. Two black, melanistic Hawks shot in the Mogollons on October 28 had not entirely completed their molt. Their back and wings, in the sun, showed a beautiful pinkish purple bloom.

In the vicinity of Mesilla Park Professor Merrill found the Red-tails the commonest hawks. As he reported, "they nest in the cotton-woods along the river in early spring and the young are foraging for themselves soon after the middle of June . . . After hawking for some time over the mesa they may be seen resting on the tips of yuccas and amoles, still on the lookout for prey. Sometimes they devour their prey there but they more often eat from the ground unless the food is to be carried back to the nest. In the valley, telegraph poles and fence posts are good places from which to take their meals. In summer the diet of this species is largely insects, mixed with ground squirrels, young rabbits and mice. Two young specimens, killed in July, had nothing in their stomachs save insects" (MS). One had eaten fifty-five locusts and the other had dined still more to repletion. A specimen taken in October near Chloride had its stomach filled with insects, mainly grasshoppers. In winter the food is principally cotton-tails, jack rabbits, and field mice. As Professor Merrill says, the damage done by this Hawk is greatly exaggerated and while almost every man's hand is against him he fully deserves the protection of the law.

Graphic descriptions of the capture of a bullsnake and rattlesnake by Red-tails are given by Mr. Jensen. "A few miles west of Santa Fe the road follows for several miles the bottom of a narrow valley fringed with rimrocks on the south side. Some of these cliffs are of considerable proportions and serve as nesting sites for Red-tails, Ravens, White-throated Swifts and other birds. Scanning the rocks through my field-glasses I discovered a male Red-tail sitting on a crag. While I was watching the bird, it suddenly dropped down to the base of the cliff, and I could see that a fierce struggle was taking place. I was not near enough to see what actually happened, but I could often see the wings of the hawk raised above the intervening low sagebrush and judge that the bird was continually changing position. I hurried as fast as I could towards the spot, and when I was about fifty feet away, the hawk took flight carrying in its talons a medium sized rattlesnake."

At another time in the same place a Red-tail was seen carrying a four foot bullsnake. "I saw the hawk pounce, but was too far away to see what took place. A few moments later the hawk reappeared carrying something heavy. The bird, with a great flapping of wings, struggled to a height of about two hundred feet, then spread its wings and sailed towards the west. During its upward flight it came straight over my head about fifty feet up" (1926, pp. 368-369).

ADDITIONAL LITERATURE.—FINLEY, W. L., *American Birds*, 57-65, 1907.—FISHER, A. K., *Biol. Surv.*, U. S. Dept. Agr., Circular No. 61, pp. 6-7, 1907.

RED-BELLIED HAWK: *Buteo lineatus elegans* Cassin

DESCRIPTION.—*Male:* Wing 12-12.5 inches, tail 8-9, bill .8, tarsus 2.9. *Female:* 13 inches, tail 9.5, bill .9, tarsus, 3-3.1. *Four quills cut out on inner webs; outer*

webs of quills distinctly spotted with white, buffy, or yellowish brown. *Adults*: Upperparts dark brown, head and neck rusty, with dark shaft streaks; *shoulders reddish brown*; quills and *tail feathers black, banded with white*; underparts *rusty or rich reddish brown*; marked posteriorly with white; bill black, cere, legs and feet yellow. *Young*: Underparts with dark brown prevailing, transversely streaked on sides and abdomen; buffy or ochraceous spots on quills much reduced.

RANGE.—Transition and Sonoran Zones from southern British Columbia, Oregon, California, and Nevada south to Mexico, and Lower California. Casual in Arizona and New Mexico.

STATE RECORDS.—A specimen of the Red-bellied Hawk was taken by Möllhausen, November 17, 1853, at a camp on the Little Colorado; and Dr. Henry reported seeing the Red-shouldered, which was probably this subspecies, at Fort Thorn in the winter of 1856-1857.—W. W. COOKE.

GENERAL HABITS.—In California the Red-bellied Hawk is found nesting in oaks, sycamores, and cottonwoods. Its call is given by Major Bendire as "a shrill *yee-ak, yee-ak'*, uttered rapidly and in a high key" (1892, p. 228).

ADDITIONAL LITERATURE.—SHARP, C. S., Condor, VIII, 144-148, 1906.

ZONE-TAILED HAWK: *Buteo albonotatus albonotatus* Kaup

PLATE 9

DESCRIPTION.—*Male*: Length 18.5-19.6 inches, wing 15-15.6, tail 8.5-9.1, bill .7-.8, tarsus 2.4-2.7. Four quills cut out on inner webs. *Female*: Length 20.8-21.5 inches, wing 16.5-17.4, tail 9-10.7, bill .9-1, tarsus 2.7-2.8. *Adults*: Black or blackish brown, feathers pure white at base; *tail with three broad lighter zones*; "iris dark brown, bill horn color, blackish at tip, corners of mouth and base of bill pale lemon yellow, cere, legs and feet empire yellow" (from Fuertes painting); bill bluish. *Young*: Tail dark grayish brown instead of black, inner webs sometimes entirely white; crossed by numerous black narrow oblique lines.

RANGE.—Lower Sonoran Zone in Arizona, New Mexico, and southwestern Texas south through Mexico, Lower California, and Central America to Venezuela and British Guiana; casual in southern California.

STATE RECORDS.—Eggs of the Zone-tailed Hawk were found May 28, 1876, in the canyon of the Gila River 20 miles above the Arizona line (Stephens). A few individuals stayed in Grant County near Apache during the entire summer of 1886 (Anthony), and in the summer of 1892 one was taken June 1 in the San Luis Moun-



From a field sketch by L. A. Fuertes in 1901

FIG. 26. Zone-tailed Hawk from Below

tains just south of the New Mexico line (Mearns). At Fort Bayard it was noted May 21, 1911 (Rockhill). [An adult female was brought to Mr. Kellogg, April 15, 1922, from Tyrone, Grant County. Another was seen on several occasions in the same locality.] The species is thus seen to be confined to the lower parts of extreme southwestern New Mexico. Since it also occurs in the Guadalupe Mountains of Texas within a few miles of New Mexico, where one was noted August 8, 1901, in Turkey Canyon (Bailey), it is probable that it will be found eventually in southeastern New Mexico. The main home of the species is in Middle and South America and the above records represent the extreme northwestern part of the range.—W. W. COOKE.

NEST.—Usually in tall cottonwoods bordering streams, made of coarse sticks lined with Spanish moss, green leaves, or inner bark. Eggs: 2 to 4, bluish white, mostly unspotted.

FOOD.—Small mammals, lizards, frogs, and fish.

GENERAL HABITS.—As Mr. H. S. Swarth has noted, the resemblance of the Zone-tailed Hawk to the Turkey Vulture when flying is very striking, both as to coloration and manner of flight (1905, p. 78). One of the interesting Zone-tails was discovered by Mr. Bailey and Mr. Fuertes in the Guadalupe Mountains in a canyon named Turkey Canyon for the Merriam Turkeys, which formerly were abundant there.

The story of the capture of the Zone-tail figured above, from a field sketch by Mr. Fuertes, is given by Mr. Bailey. "Near the last of May in 1901, while Oberholser, Fuertes, and I were camped at the junction of Tornillo Creek with the Rio Grande near Boquillas in the Big Bend country of west Texas, Oberholser came hurrying in, exclaiming, 'Get all the ropes in camp. Fuertes is up on a cliff and can't get down or up.' We gathered up about 150 feet of picket ropes and went back along the top of the canyon wall for a mile, where we found Fuertes standing on a shelf about a hundred feet below the top of a cliff and several hundred feet above the bottom. He had shot a fine Zone-tailed Hawk, the first he had ever seen in life, but it had fallen high up the side of a rocky gulch and he had worked his way up an almost perpendicular cliff to get it. Then in trying to get up over the top he had reached an overhanging ledge that barred further progress, only to find that it was impossible to go down the way he had come up. His shelf was wide enough for a comfortable seat but not a good place to camp over night, and fortunately after shouting and firing his shotgun he had finally attracted the attention of Oberholser, who had left camp later than he and was collecting birds on the mesa above, meanwhile wondering at his disappearance. Following the direction of the faint voice coming from down in the canyon, he reached the rim from which he could see Fuertes, unable to get either up or down. A rescue was speedily planned. Within another hour we reached the top with the ropes, tied them together and with one end fastened to a sturdy catsclaw bush above, the other was let down over the cliff and swung back and forth till it came in where Fuertes could catch it and loop it around one leg. Then while we pulled up the

rope he swung to shelf after shelf and finally climbed up over the rim, with his prize carefully protected inside his shirt."

The adventure was little thought of at the time but the handsome Zone-tail afforded material for careful study, numerous sketches, and finally a beautifully prepared specimen. Among the sketches in Fuertes' notebook were several giving overhead characters as the bird circled above him before it was shot, and the numerous color sketches of eyes, bill, cere, feet, and claws have since served as a basis for accurate illustrations of the species.

An historic egg of this handsome Hawk is now in the egg collection of the National Museum where, to my great enjoyment, Major Bendire once showed it to me, recounting in his vivid way the adventure which he touches upon in his *Life Histories*. The egg was found in 1877 in Arizona, the nest being in a cottonwood five miles from the camp where the Major was stationed to watch hostile Apaches. On climbing the tree to secure the egg before collecting the old bird, he glanced down and discovered what he had not been able to see from the ground—"several Apache Indians crouched down on the side of a little canyon," with heads raised, watching him. Crowding the large egg quickly into his mouth as the safest way to carry it, he slid down the tree slowly enough to disarm the suspicions of the watching Indians, but on reaching his horse made good time till well out of range of their guns. On reaching camp, he promptly returned with a party of soldiers, but as he remarks naively, "what follows has no bearing upon my subject. I only mention the episode to account for not having secured one or more of the parents of these eggs." He does state, however, that at the end of his five mile ride with the egg he found it "no easy matter to remove the egg" from his mouth, and he confesses that, when he finally succeeded, his "jaws ached for some time afterward" (1892, pp. 231-232).

SWAINSON HAWK: *Buteo swainsoni* Bonaparte

PLATES 9 AND 11

DESCRIPTION.—*Male*: Length 19.5-20 inches, wing 14.4-16, tail 8-9, bill .8-.9, tarsus 2.3-2.7. *Female*: Length 21-22 inches, wing 14.7-17.2, tail 9-10, bill .8-.9, tarsus 2.5-2.9. Wing with *three quills cut out* on inner web. *Adult male in normal plumage*: Upperparts nearly uniform dark brown; tail crossed by about nine or ten narrow blackish bands; throat and belly white, sharply contrasting with reddish brown chest band. *Adult female in normal plumage*: Like male but chest patch grayish brown instead of rufous. *Dark phase, both sexes*: Sooty brown. Every possible gradation occurs between these dark and light phases. Iris brown, never yellow; cere, gape, legs and feet rich yellow. *Young in juvenal plumage*: Upperparts blackish brown varied with buffy or yellowish brown; head, neck, and underparts buffy or fawn color, head and neck streaked, and underparts usually more or less marked with blackish.

COMPARISONS.—Seen from below, the black wrist marks and dark chest band of the normal adult male are distinctive. In the hand, in any plumage, the Swainson

may be distinguished from the other Buteos by having *three* instead of four wing quills cut out.

RANGE.—Breeds from British Columbia (mostly in arid interior) and Manitoba (more rarely from northern Alaska and northern Mackenzie south to Chile; winters from Colorado and South Dakota south to northern Argentina.



From Biological Survey

FIG. 27. Swainson Hawk Nestlings

Look pleasant, please!

STATE RECORDS.—The Swainson Hawk is a common breeder in the open parts of New Mexico from the lowest levels of the plains to the foothills of the mountains, [taken May 10, 1917, at Silver City (Kellogg); common in Grant County, May 6-10, 1920 (Ligon)]. It breeds near Mesilla, Carlsbad, Roswell, Deming, Apache, Socorro, Santa Rosa, Las Vegas, and Shiprock, thus nesting almost entirely below 6,000 feet. The eggs are usually laid in May or early June. Eggs were taken at Mesilla in May (Merrill), and young found in a nest June 15, 1913, near Tularosa; [eggs seen in a nest, May 10, 1920, 10 miles southwest of Lordsburg. In the Pecos Valley, June 16-21, 1918, the species was rather numerous, nesting; and also found in goodly numbers along the river tributaries where there were suitable trees. They also nest in the Jornada, east of the Rio Grande about Engle, generally the first ten days of May (Ligon)].

In the fall migration they move up slightly into the mountains and have been noted September 10, 1903, near Black Lake at about 9,000 feet (Bailey), and Vermejo Park at about the same altitude in late September, 1903 (Howell). Near Koehler Junction they were quite common; seen August 27, September 1 and 10, 1913 (Kalmbach) [between Silver City and Deming many were seen, August 26, 1917; also between Las Cruces and Socorro many seen, August 27, 1917; and 40 miles northwest of Silver City, 50 migrating birds seen in the open valleys September 16, 1917 (Ligon)]. A flock containing at least 100 individuals passed over the summit of Bear Spring Mountains September 29, 1905, flying 8,000-9,000 feet high (Hollister).

Though a few probably remain in New Mexico through the winter, most of them go far south, even to South America. They were still common the middle of October, 1905, in the foothill region of the Datil and Gallina Mountains (Hollister). A single bird wintered on the Mimbres 1852-1853 (Henry); [one seen December 6, 1918, at Engle, and great numbers January 5-7, 1919, between Carlsbad and the San Simon Ranch (Ligon)].—W. W. COOKE.

A hawk described from near Fort Webster by Cassin as *Buteo oxypterus* proves to be the same as *Buteo swainsoni*.

NEST.—Most commonly in New Mexico in mesquite, catsclaw and bushes, but also in tall soap weeds (yuccas), the thick foliage of young cottonwoods, and sometimes on a cliff; made of sticks lined largely with green leaves and bark and sometimes with grass or fur. Eggs: 2 to 4, greenish, buffy, or pure white, usually moderately marked with brown and gray.

FOOD.—Almost entirely small rodents—ground squirrels, mice, and gophers—grasshoppers, and crickets; *lives largely on grasshoppers in summer and fall*. Nests found by Mr. Ligon, June 18 and 19, 1918, contained young cottontail rabbits, a Scaled Quail, and the tail of a large blue lizard. Wherever there is a visitation of grasshopper, they are sure to congregate.

GENERAL HABITS.—Both in the treeless parts of the west and also in wooded regions, the Swainson is one of the more common large hawks, of good habits. As Doctor Fisher states, it "rarely touches poultry, game, or small birds," and he adds that in the southwest he as well as others have "often seen the nests of small birds in the same trees and in close proximity to the nests of the Hawks, the birds apparently living in perfect harmony" (1907, p. 9).

At Mesilla Park, Professor Merrill notes the Swainsons are not so abundant as the Red-tails. Their habits are similar, however, both being residents and both being found on the mesa and in the trees bordering streams. An interesting nest with eggs, to be seen in the college museum, was taken in May. The nest is bulky but shallow, made mainly of creosote twigs with a few dead cholla canes and some sunflower stalks, lined with corn husks and amole fibers (MS). In nests containing young, Mr. Ligon has found remains of snakes, lizards, young rabbits, and ground squirrels (MS).

In summer, in the Jornada Valley, Sierra and Dona Ana Counties, Mr. Ligon found the Swainsons fairly common, while early in fall they became abundant, moving over the flats and hills in great flocks, feeding on the big grasshoppers. In describing a flock seen in the Bear Spring Mountains, Mr. Hollister said that during a heavy windstorm over a hundred passed above his camp. As he reported, "I counted forty at one time near the camp, some high and others down among the trees, and they were one hour or more in passing, as the movement of the flock from northeast to southwest was very slow, the birds continually circling. But few were seen to light, but the stomach and crop of the one shot were filled with grasshoppers" (MS).

These fall flocks which collect soon after the breeding season in the foothills and on the plains sometimes contain hundreds of individuals and feed almost exclusively on grasshoppers and crickets. For a flock of three hundred hawks, Doctor Fisher estimates 900,000 grasshoppers destroyed in a month, with a saving to the ranchman of thirty tons of produce; and this estimate he considers too low by half. As he asks, "what estimate can be placed on the services of the hundreds of thousands which are engaged in the same work for months at a time?" And yet, one of the western States put a bounty on hawks and owls and "thousands of grasshopper eating hawks were destroyed at the public expense!" (1907, p. 88). Still we complain of the destructive work of insects!

In Montana Mr. Cameron's ranch was visited in April, 1890, by a migrating flock of about two thousand Swainson Hawks. They filled the trees and sat in rows on the ground among the cattle. But on the following morning they "had vanished as completely as the Assyrian host" (1907, pp. 262-263).

On one of the autumnal migrations of hawks of various kinds, an extraordinary flight was witnessed by H. S. and H. B. Forbes, over Mount Monadnock, N. H. Thirty or forty gathered, "swooping, turning, and soaring upwards in irregular steep spirals . . . until the specks resembled a swarm of large insects, black against the pearl-gray clouds . . . Finally the whole flight had spiralled upward into the cloud mass and was lost to view." The height of the clouds—with Mount Washington for scale—was estimated as about 7,000 feet. As the flock had circled upwards, it had moved in a southerly direction, and "it seems probable" that the migrating band "found it advantageous to rise above the cloud curtain" (Auk, 1927, pp. 101-102).

In winter after the insects had disappeared, great numbers of Swainson, Marsh, and Ferruginous Rough-legs found by Mr. Ligon between the San Simon Ranch and Carlsbad were "apparently contentedly wintering where rats and rabbits were so abundant" (MS). It has been estimated that the Swainson "saves western farmers \$117,000 annually by the destruction of grasshoppers and field mice" (Forbush).

ADDITIONAL LITERATURE.—SHARP, C. S., Condor, IV, 116-118, 1902.

AMERICAN ROUGH-LEGGED HAWK: *Triórchis lagópus sáncti-johánnis* (Gmelin)

PLATE 9

DESCRIPTION.—*Male:* Length about 19.5-22 inches, wing 15.7-16.8, tail 9-10 bill 1.3-1.4. *Female:* Length about 21.5-23.5 inches, wing 16.1-18, tail 9-11 Like *Buteo* but bill small and weak and *leg feathered down to toes:* wing with four quills cut out on inner webs. *Adults, normal phase:* Upperparts brown, marked with white, rusty and yellowish brown; *tail white at base*, barred beyond, and with dusky terminal band; wing quills tipped with black, wing linings blackish making

heavy black "wrist mark;" underparts from white to yellowish brown, spotted and streaked with "tendency to excess of whitish on head and to formation of a dark abdominal zone" (Coues). *Dark phase in both young and old* connected with normal plumage by variations—black except for white forehead, white on wing quills and bands on base of tail; iris light brown to yellow, bill mainly dark horn color, cere greenish yellow; legs and feet dull yellow. *Young in juvenal plumage:* Similar to normal adults but end of tail plain grayish brown, basal part whitish; underparts usually more buffy, with *wide blackish abdominal belt*.

COMPARISONS.—The white patch at the base of the tail suggests the Marsh Hawk but the brown, instead of bluish, upperparts distinguish it from the male Marsh Hawk and seen from below the black wrist marks distinguish it from the Marsh with its plain white under wings. (See Plates 9 and 15.)

RANGE.—Breeds chiefly in Hudsonian Zone from the Aleutians, northwestern Alaska, Arctic coast, and northern Quebec and Labrador south to Newfoundland, northern Alberta, and central British Columbia; winters from southern British Columbia, northern United States, and southern Ontario south to South Carolina, Georgia, Louisiana, Texas, southern New Mexico, and southern California.

STATE RECORDS.—From its Canadian breeding grounds, the Rough-legged Hawk retires in the winter as far south as southern New Mexico. One was taken November 9, 1853, near Zuni, by Kennerly, and Henry did not consider it a rare winter bird along the Rio Grande near Fort Fillmore about 1854, though he found it only once on the Rio Mimbres near Fort Webster. No record of the occurrence of the species in New Mexico seems to have been made for the next half century, but on November 29, 1902, one was taken at Tularosa (Gaut). These localities mark the extreme southern limit of the range and since the bird is found in winter in the Rocky Mountains not farther north than Colorado, it is probable that it is more common in northern New Mexico than the records would indicate. Several were seen near Koehler Junction and a specimen was taken on September 30, 1913 (Kalmbach); at Pinabetitos, one was seen November 25, and at Perico, on December 11, 1893, it was found common (Seton).—W. W. COOKE.

NEST.—In high trees or on rocky ledges, bulky, made of large sticks, lined with grass, leaves, or feathers. *Eggs:* 2 to 5, dull white, sometimes unmarked, but generally more or less spotted, blotched, or scrawled with brown.

FOOD.—Almost exclusively rodents; in winter, mainly meadow mice which, at times, become "very distinctive pests"; also carrion (Seton).

GENERAL HABITS.—A pair of Rough-legs found by Mr. A. M. Bailey at their nest in northwestern Alaska showed both color phases, the male being dark, the female light-colored. In their native north land they are birds to arouse the enthusiasm of the bird lover, and Mr. Bailey writes—"To me the Rough-leg is one of the finest of our birds of prey . . . Hovering high over the mountains bordering placid harbors, dark against the cloud-filled sky, its eerie calls carry for a distance, lending enchantment to the most isolated regions (1926, p. 123).

When cold weather comes in these far regions of Hudsonian Zone with its accompaniment of deep snow and thick ice, as Mr. Forbush says, "a vast army of Rough-legged Hawks moves southward toward the United States. When starting on migration they soar to a great height and then set their course. Probably they travel at such high altitudes

that they are seldom noticed in migration. . . . They seem to be able to see well in the gathering dusk, as they hunt very early in the morning and after sunset when mice are active" (1927, 143).

This large winter visitant from the far north, called "Squalling Hawk" by the people of Labrador from its loud screams, prefers flat open country to heavily timbered regions. It is one of the most beneficial of hawks. As Doctor Fisher says, "the Rough-leg is one of man's most important allies against meadow mice, feeding on little else during its sojourn in the United States," hunting largely "during twilight and early dawn, when small mammals are most active" (1907, p. 5).

Unfortunately both the Rough-legged Hawks and the Golden and Bald Eagles have been greatly reduced in numbers by getting accidentally caught by coyote and wolf trappers, and those that are left need especial safe-guarding.

FERRUGINOUS ROUGH-LEG: *Triórchis ferrugíneus* (Lichtenstein)

PLATES 9, 11, AND 12

DESCRIPTION.—*Male:* Length about 22.5 inches, wing 15.9-17, tail 9.5-10.5 bill 1.7-1.9, gape about 1.8. *Female:* Length about 24 inches, wing 17-18.8, tail 10.5-11; wing with four quills cut out on inner web; legs feathered in front to toes. *Adults, normal phase:* Upperparts, flanks, and feathered legs ferruginous, the upperparts streaked, the flanks and feathered legs barred with blackish; tail white washed with ash gray and stained with ferruginous; wings with quills and secondaries lead color; wing linings white marked with rufous; underparts white, sometimes slightly streaked with dusky; iris, cere, and feet bright yellow. *Dark phase:* Body chocolate-brown, varied with rusty; tail normal. *Young:* Upperparts grayish brown, with less rufous, the feathers edged with rusty or yellowish brown; underparts and flanks white, the flanks more or less spotted with dusky, markings extending onto belly; tail whitish for basal third, usually with several more or less distinct dark bands.

COMPARISONS.—The two Rough-legged Hawks, the Western Red-tail and Swainson, fairly comparable in size, and with confusing normal, melanistic, and variously intermediate plumages, may be difficult to identify. The feathered tarsus of the two Rough-legs, however, when it can be seen, separates them from the Western Red-tail and Swainson (see Swainson, comparisons, p. 167), and the red tail of all adult Western Red-tails distinguishes them. Of the two Rough-legs, the American has a dark terminal tail band lacking in the Ferruginous, never has as much white on the breast nor ruddy on the back and flanks as the Ferruginous, and in one plumage is easily recognized by its dark abdominal band. (Pl. 9.) In similar black plumages the shape of the bill, as seen from above, distinguishes the two, being narrow and constricted toward the gape in the American, "broad and frog-mouthed" in the Ferruginous (Taverner).

RANGE.—Breeds mainly in Transition Zone from southern Washington (probably a summer resident in arid southern interior of British Columbia), southwestern Saskatchewan, and southern Manitoba south to Kansas, Colorado, Utah, and southern California; winters from Montana to Lower California and Mexico.

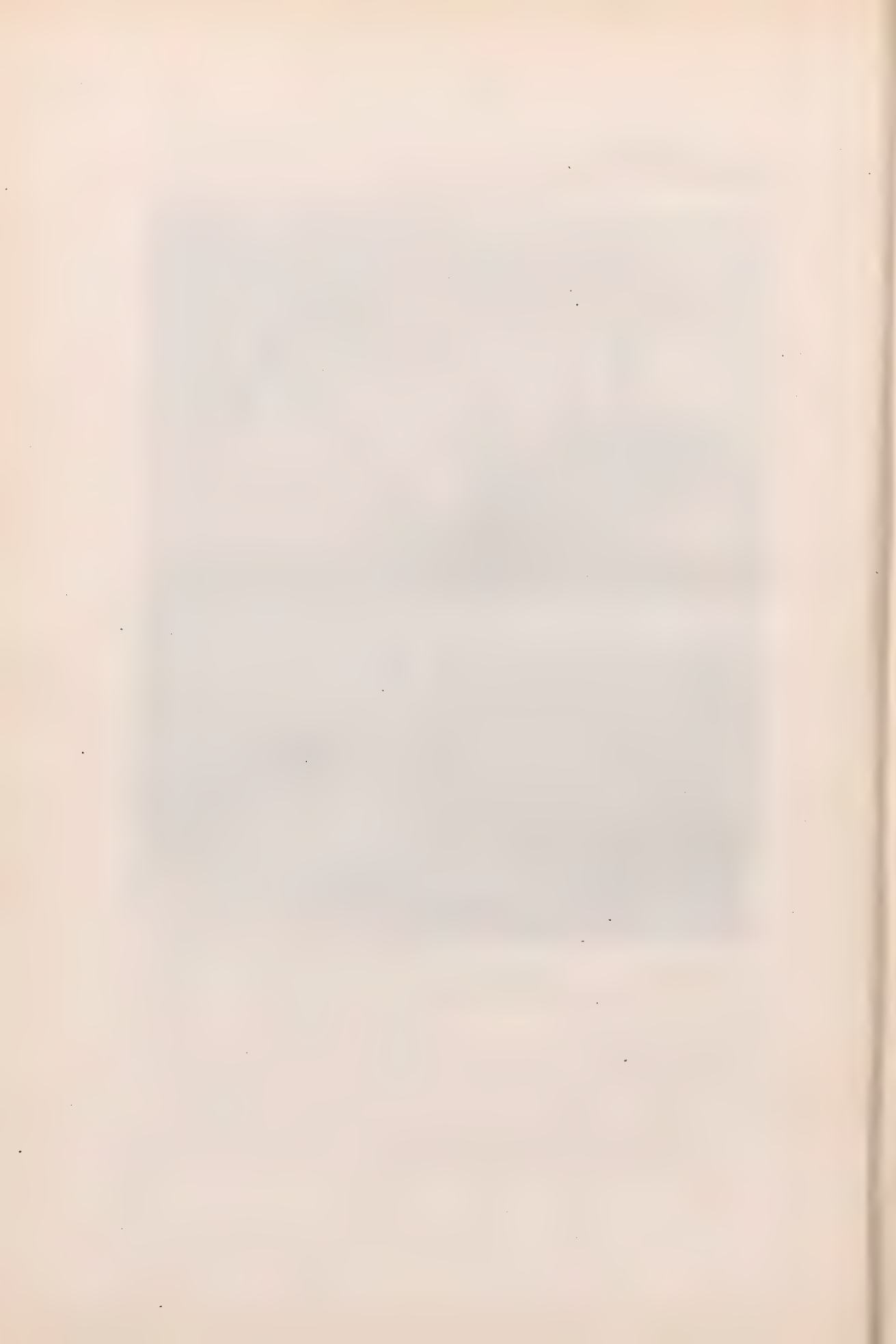
STATE RECORDS.—The Ferruginous Rough-leg breeds south to central Colorado, and in New Mexico most abundantly on and about the Saint Augustine Plain, northwest, west, and southwest of Magdalena, at about 6,500-7,000 feet.



From mounted group in Colorado Museum of Natural History

FERRUGINOUS ROUGH-LEGS

An expectant family, with no prejudices against snakes



A specimen taken October 11, 1906, near Joseph (Bailey), probably represents about the beginning of the fall migration. [Two were seen near Carrizozo along the railroad, October 4, 1918 (Ligon),] and from October 15 to November 4, 1908, the species was rather common at Fruitland (Birdseye). It is rather common in winter in the southern half of the State (Ligon), occurring at Silver City (Hunn), at Fort Fillmore (Henry), in the vicinity of Carlsbad Bird Reserve, January 1915 (Willett), and at the mouth of San Nicholas Canyon in the San Andres Mountains, January 21, 1903 (Gaut); [three were seen, December 6 and 9, 1918, 15-20 miles northeast of Engle and great numbers seen from San Simon to Carlsbad January 5 to 7, 1919.

Others observed almost daily May 6-10, 1920, from an automobile between Silver City and the Mexican boundary, were presumably late spring migrants (Ligon). One or two were seen several times during April and May, 1924, and others in May, 1925, near La Bajada Hill, 15 miles southwest of Santa Fe, and it has also been seen occasionally in Arroya Hondo, five miles southeast of Santa Fe (Jensen)].—W. W. COOKE.

NEST.—In high junipers in open places and sometimes in yellow pines or even on the ground, sometimes on rocky precipitous hillsides; great masses of sticks or even buffalo ribs, at times measuring three feet in diameter and two or more in depth. *Eggs*: 2 to 5, creamy or pale greenish, irregularly blotched with brown and lavender.

FOOD.—Almost entirely small mammals, especially mice; also rabbits, ground squirrels, pocket gophers, prairie dogs, and snakes; almost never birds:

GENERAL HABITS.—The large stately Ferruginous Rough-leg, easily recognized in its normal phase by its light underparts and tail and its rufous feathered legs, is the southern relative of the Rough-leg. The Ferruginous lives so largely on the ground squirrels of the prairie that it is known locally as the Squirrel Hawk. "Great is the service it performs in keeping their numbers in check," Doctor Fisher exclaims, adding: "It is humiliating to think how many of these two noble hawks are ruthlessly murdered," and that bounties are paid on their heads "to satisfy ignorant prejudice" (1907, pp. 5-6).

In the Carlsbad region in 1924, Mr. Bailey saw "many carcasses of these big, beautiful and useful hawks strewn along the roadsides, shot from passing automobiles as they sat on fence posts or telephone poles watching for ground squirrels." As he says, "few hawks have greater value to farmers in the plains and prairie country where ground squirrels are a serious pest" (1928a, p. 139).

ADDITIONAL LITERATURE.—CAMERON, E. S., *Auk*, XXXI, 159-167, 1914.

HARRIS HAWK: *Parabuteo unicinctus harrisi* (Audubon)

PLATE 9

DESCRIPTION.—*Male*: Length 17.5-21 inches, wing 12.3-13.7, tail 9.8-10.2, bill .9, tarsus 3.1-3.2. *Female*: Length 21-24 inches, wing 14.2-14.5, tail 10.8-11, bill 1.1, tarsus 3.4-3.7. Five outer quills cut out on inner webs. *Adults*: Upperparts dark sooty brown, reddish brown on shoulders, under wing coverts, and thighs; tail black with white base and broad white tip. *Immature*: Blackish upperparts with yellowish brown feather edgings, head and neck streaked; rump white and

tail like adult but with narrower white tip and inner webs of feathers barred; underparts yellowish brown, vertically striped or spotted with dusky.

RANGE.—Lower Sonoran Zone in southeastern California, southern Arizona, southeastern New Mexico, southern Texas, Louisiana, and Mississippi south to Cape San Lucas and Panama.

STATE RECORDS.—A nest of the Harris Hawk was found June 2, 1919, 2 miles northeast of Carlsbad at about 3,000 feet altitude, the eggs being probably three-fourths incubated. On January 5, 1919, at Monument Draw, a few miles northeast of Jal, and on January 7, on the San Simon Ranch about 20 miles northwest of Jal, great numbers were seen, especially on the San Simon, where 15 spent the night of January 7. On May 31, 1919, one was seen on the Staked Plains about 50 miles northeast of Carlsbad (Ligon).

NEST.—A compactly made platform of sticks, twigs, weeds, and roots lined with green mesquite, elm shoots, and leaves, grass, bark, Spanish moss, and roots, placed in cactus, Spanish bayonet, chaparral, mesquite, hackberry, and other trees (one, reported by Ligon, lined with the hair nest of an Oriole). *Eggs*: 2 to 4, soiled white, occasionally greenish, unmarked or spotted lightly with pale brown or lavender.

FOOD.—Largely offal, reptiles (lizards and small snakes), small mammals, such as cottontail rabbits, cotton rats, and field mice, and occasionally birds.

GENERAL HABITS.—The rich rufous marks and characteristic tail of the Harris Hawk distinguish him readily. At the nest, both parents, Mr. Sennett found, assist in incubation and care of the young, "being sometimes fearless in protecting them" (1879, pp. 419-420). He is common and tame on the coast prairies of Texas where he may be seen perching on telegraph poles, although he is considered "very terrestrial" in habit (Friedman, 1925, p. 545). In the mesquite thickets, as Mr. Bailey found, "you may meet one at close quarters as he dashes under the thorny bushes in quest of wood rats, ground squirrels, and the small game that abounds in these dwarf forests" (1902, p. 154).

When not hunting or caring for the young, as Mr. G. F. Simmons says, he is a sluggish, heavy, slow-flying bird . . . associating with the Black and Turkey Vultures and the Audubon Caracara." His call is a long harsh scream (1925, p. 100).

At a tank on the San Simon Ranch in the southeastern part of New Mexico, Mr. Ligon wrote, in January, 1919, fifteen Harris Hawks spent the night in the large willows—the only trees in the locality. At this season the birds seemed rather inactive, several together sitting on the ground near the thickets of chaparral or sometimes on top of the brush, whether seeking protection from the strong cold winds or looking for rats and rabbits, was not determined. At Monument Draw, however, the jack rabbits were constantly moving about among the hawks and seemed to pay no attention to them (MS).

In the fall migration, on October 27, 1920, a flock of four or five hundred of the handsome Harris Hawks was seen by Mr. Frank Richmond of El Centro, California, scattered over an area of about eighty

acres, perched on posts, hillocks, and bare ground (in Chambers, 1921, p. 65). Three years later, on August 28, 1923, another impressive migration flight was witnessed, within two miles of that recorded before (in Chambers, 1924, p. 75).

MEXICAN GOSHAWK: *Asturina plagiata* Schlegel

PLATE 9

DESCRIPTION.—*Length:* About 16-18 inches, wing 9.5-11.7, tail 6.7-8.2, bill .7-1, tarsus 2.5-2.8. Proportions of *Buteo* but coloration of *Astur*. Four outer quills cut out on inner webs. *Adults:* Upperparts ash-gray, top of head and back of neck with fine blackish shaft streaks; upper tail coverts white, tail black, tipped with gray or white and crossed by two or three narrow white bands; wing quills black, tipped with whitish; wing linings white, barred with ashy; underparts closely cross-barred with gray and white except on throat and crissum; iris brown; bill blackish, cere, legs and feet bright yellow. *Young:* Blackish brown above, variegated with reddish buff, upper tail coverts spotted with blackish; tail dark brown, with numerous narrow blackish bars; white below, marked with black.

RANGE.—Southern Arizona, southwestern New Mexico, and Lower Rio Grande Valley south to Costa Rica; winters south of United States.

STATE RECORDS.—Two sets of eggs of the Mexican Goshawk were found April 23, 1876, near Fort Bayard, New Mexico, by Frank Stephens, who had noted the birds as common a few miles to the westward in Arizona. This is the only record of the species for New Mexico, where it is a summer resident.—W. W. COOKE.

NEST.—Usually in high trees; made of leafy twigs, lined with dry leaves and strips of bark. *Eggs:* Generally 2, pale bluish white, unspotted or with a few indistinct buffy spots.

FOOD.—Chiefly mice but many birds; also ground squirrels, lizards, fish, beetles, grasshoppers, and other insects.

GENERAL HABITS.—Near Tucson Major Bendire found "two or three pairs of these handsome little Mexican Goshawks, which were readily recognized by their light color, engaged in sailing gracefully over the tree tops." He says they seem to be found only in the vicinity of water-courses (1892, p. 252).

MEXICAN BLACK HAWK: *Morphnus anthracinus* (Lichtenstein)

PLATE 9

DESCRIPTION.—*Male:* Length about 21.5 inches, wing 13.1-14.9, tail 7.9-9.7, bill 1, tarsus 3.2-3.4. *Female:* Length 20-22.5, wing 14.2-16, tail 9.2-11, bill 1-1.1, tarsus 3-3.5. Wing with four quills cut out on inner webs. *Adults:* Coat black, except for tail which has white-tipped coverts, white base, tip, and broad median band; bill blackish, cere, legs and feet, yellow. *Young:* Upperparts brownish black, varied with rusty or yellowish brown markings, gradually obliterated as the bird matures; tail with about seven narrow oblique bands; head, neck, and underparts yellowish brown, striped with blackish, thighs barred; iris brown bill mainly black, cere, legs and feet yellow.

RANGE.—Lower Sonoran Zone in southern Arizona, New Mexico, and Lower Rio Grande Valley south through Mexico and Central America to Peru and Paraguay.

STATE RECORDS.—While engaged on the Mexican Boundary Survey, Mearns collected a Mexican Black Hawk, July 7, 1892, in the San Luis Mountains of New Mexico, and four days previously had taken another at Cajon Bonito, a few miles to the southward in Sonora; so it is probable that they are regular visitants to the districts as they are known to be to the neighboring parts of southeastern Arizona. [Mr. Ligon has seen specimens taken on the Gila River east of Cliff, where he is quite sure that they nest; while Mr. Kellogg has a specimen taken on the Gila in the summer of 1918 and found a pair nesting in a cottonwood grove on the Gila, 20 miles west of Silver City, May 29, 1921.] Ligon reports a specimen taken 20 miles east of Silver City, October 3, 1915.—W. W. COOKE.

NEST.—In a large tree near water, or in a cup in rock, bulky; made of sticks and herbage, lined with leaves. *Eggs*: Usually 2, white, irregularly blotched with brown, chiefly around the larger end.

FOOD.—Reptiles, fish (occasionally), small mammals, crustaceans, and insects.

GENERAL HABITS.—The Black Hawk needs to be carefully distinguished from the black Zone-tailed, as the tail patterns are similar. It has a cry which Major Bendire compares to the spring piping of the Long-billed Curlew (1892, p. 248), and has been found by Doctor Mearns along a river "hidden in the foliage near the water" (in Bendire, 1892, p. 249).

In British Honduras, Mr. G. B. Thomas found it abundant in "the long stretches of sand dunes and savannas studded here and there by clumps of palmetto and gnarled pines," after sundown flying about catching the huge land crabs that abound there (1908, p. 117).

GOLDEN EAGLE: *Águila chrysætos* (Linnaeus)

PLATES 9 AND 13

DESCRIPTION.—*Male*: Length about 30-35 inches, wing 23-24.7, extent about 6½ to 7 feet, tail 14-15, bill 1.5-1.6, tarsus 3.6-3.8. *Female*: Length about 35-40 inches, wing 25-27, extent about 7-7½ feet, tail 15-16, bill 1.7-1.8, tarsus 4.1-4.2. Bill robust; wing with five quills strikingly cut out. *Legs feathered to toes. Adults*: Dark brown with loose, lanceolate feathers of back of head and hind neck tawny, or "golden" brown; quills and tail blackish, basally more or less clouded or banded with gray; flight feathers nearly black, iris brown, bill bluish horn or blackish, cere, legs and feet, yellow. *Young*: Much darker (almost black) below, tail with black border and basal half to two-thirds plain white.

COMPARISONS.—In flight the juvenal Golden Eagle is hard to distinguish at a distance from the young Bald Eagle, showing as a black bird with a black-bordered white tail and prominent white patch at base of primaries, visible on both upper and lower surfaces (Taverner); "in flight seems like a big *Buteo* circling upward often to great heights . . . usually shows whitish area on underside of each wing toward end" (Forbush). (See Plate 9.)

RANGE.—Northern part of Northern Hemisphere, south in the Old World to North Africa and the Himalaya Mountains. In America breeds from northern Alaska, northwestern Mackenzie, and northern Quebec south to North Carolina, Ontario, western Texas, central Mexico, and middle Lower California; winters to Florida, Alabama, and (rarely) southern Texas, and Lower California.



From mounted group in Colorado Museum of Natural History

A FAMILY OF GOLDEN EAGLES ON THEIR AERIE

STATE RECORDS.—Resident in New Mexico throughout the year, the Golden Eagle is a common sight in the mountains from the foothills to the loftiest summits. [One was seen June 19, 1924, soaring over Wheeler Peak, the highest peak in the State—13,600 feet (aneroid). In 1924 a few were seen east of the Pecos and in the northeastern section of the State (Ligon).] The nests that have been reported were found at median altitudes. An old nest was found, June, 1903, on the cliffs near Cuervo at 5,000 feet (Bailey). Two nests were noted September, 1905, on the cliffs near the mouth of the Rio San Jose at 6,000 feet; others on the cliffs near Fort Wingate at 7,000 feet (Hollister); and one at about 8,000 feet on a cliff in Hondo Canyon (Bailey). [In northern Santa Fe County nests have been located in Apache Canyon (two downy young April 11, 1920, and nearly fresh eggs on February 27, 1921); also at La Bajada Hill, 15 miles southwest of Santa Fe, in White Rock Canyon at the head of Rito de los Frijoles, near St. Peter's Dome, and also near Jemez Pueblo (Jensen, 1923).] It was common in southeastern Union County—noted at Clapham, the Callis Ranch, and Perico in November, 1893 (Seton). Eagles nest commonly near Monticello in the San Mateo Mountains, and a nest with eggs about ten days incubated was found March 15, 1913, near Chloride; another March 18, 1915, about 18 miles northwest of Reserve, Socorro County, at about 8,000 feet (Ligon). Nests containing three eggs have been found in Ash Canyon southeast of Elephant Butte, on Elephant Butte (Willet), and in Socorro County, west of the Rio Grande. The eggs are laid in January and February and as late as March (Ligon). Individuals apparently on their breeding grounds have been seen in the Capitan Mountains (Gaut), Animas Mountains (Goldman), [common in and about the Animas Mountains (Ligon, 1920)], near Silver City (Fisher), near Tres Piedras (Loring), in the Chuska Mountains (Birdseye), and at Lake Burford (Wetmore); while in the Datil Mountains they were so common that they were seen almost every day and several dead bodies were found near a ranch, the owner of which said that he had poisoned nearly a hundred in a single winter (Hollister).

After the young are fully fledged both old and young can be found at all altitudes, even above 12,600 feet, where they were seen over the top of Pecos Baldy (Bailey). [One was seen June 28, 1919, 16 miles north of Cowles, hovering over the barren peaks at the head of the Pecos and they are said to be rather common about the high peaks (Ligon).] One was seen along Red River, Colfax County, August 25, 1913 (Kalmbach).

They remain in the State through the winter, though, of course, at this season they are most common near the foothills, and descend even to the low parts of the State as the Dona Ana Mountains, January 2, 1903 (Ford). In the Guadalupe Mountains, south of Queen, December 31, 1915, they were "very abundant" (Ligon), and throughout the region of the Carlsbad Bird Reserve, fairly common January, 1915; [several were seen December, 1916; also on the Rio Grande Bird Reserve they were noted November 23–December 9, 1916, an old nest on Elephant Butte (Willet)]. Several were seen January 5 to 7, 1919, in the region of Carlsbad (Ligon).—W. W. COOKE.

NEST.—In New Mexico, generally on cliffs, but also in cottonwoods and yellow pines, sometimes five feet in diameter and three or four feet in depth; made of sticks and lined with straw, grass, leaves, moss, feathers, or fur. Eggs: Usually 2 or 3, whitish, obscurely or heavily blotched with brown, and with pale lavender under shell markings.

FOOD.—Mainly mammals and birds, including squirrels, prairie dogs, spermophiles, rabbits, fawns, lambs, kids, turkeys, grouse, and waterfowl; some carrion; also "numbers of rattlesnakes."

GENERAL HABITS.—The sight of either a Golden Eagle or its nest is an event, for it is a royal bird of the mountains, building its nest on precipitous cliffs or on the walls of remote canyons. On our way down Hondo Canyon in the Taos Mountains, on August 10, 1904, we saw two Golden Eagles sailing over the slope of the canyon, back and forth, almost without a wing-beat, merely tilting their wings at different angles as they crossed and recrossed, rose and fell. One of them, at least, in turning showed a white base to the tail. After hunting soberly for some time, occasionally lighting for a moment's rest on a tree top or a cliff, they coyly approached each other in the air but on the instant one flew off and the other swept out and up in the arc of a circle and then with a quick turn came darting down with set arrow-like wings. The performance had the air of coquettish courtship play, and the swoop up and dash down suggested the nighthawk's aerial feats. The next sight took us still more by surprise. Both birds lit on a niche of the cliff and their heads showed above a huge nest! As we watched, they pitched off into the air and resumed their sailing. One of them soon lit on the dead branch of a tall tree a second, then gave a backward flap and jerk and flew, with the branch bristling out behind its feet, back to the nest. As this was on the tenth of August, it was a trifle unexpected (1905a, pp. 39-40).

An old nest found at 5,000 feet on the cliffs near Cuervo was three or four feet high and contained several bushels of sticks, at least three nests being piled one above the other. At the foot of the cliff below was an assortment of whitened bones. Jack-rabbit jaws and thigh bones, as Mr. Bailey found, predominated, but there were also jaws and skulls of cotton-tails, prairie dogs, and pocket gophers, and a fragment of land turtle's shell, with numerous pellets of rabbit's fur.

When a jack rabbit is out on the open prairie, Ernest Thompson Seton says, "the eagle can get him with something like certainty; but when under a bush, no matter how small, he is safe; for the eagle will not swoop at the rabbit. The fear of cactus and bayonet is ever on these birds." The eagles, Mr. Seton says, "do much damage to the pelts of coyotes that have been killed by poison, so are not in favor with the hunters"; but he adds, "no one considers them a menace to calves or to sheep under guard" (MS).

Though the eagles kill some grouse, as Mr. Seton Gordon wrote, "some good sportsmen think a heavy bag is not everything in life and are willing to allow the eagle to remain, as he adds a great charm to the hills," and Dr. Witmer Stone comments, "Let us hope that this view may be more widely held by sportsmen in America before all of our splendid birds of prey are exterminated because they claim an inherent right to share the game with the sportsmen" (1927, p. 578).

Golden Eagles were seen by Major Goldman hunting prairie dogs on the San Augustine Plains. Several pairs were seen soaring at low elevations over the plain, and one was seen to swoop down close to a prairie-dog hole, though before reaching the ground it shot upward again. A forest ranger when about half a mile away saw an eagle dart down and on riding over to the place scared up the bird from a freshly killed prairie dog, its bones already nearly stripped of flesh (MS). Another eagle, seen by Mr. Ligon in the Black Range, was picking the bones of a calf that had been killed by wolves. In western Socorro County, where they were very abundant, March 22, 1915, Mr. Ligon also found that they were feeding not only on jack rabbits and prairie dogs, but on the carcasses of stock killed by the wolves, wolves, eagles, and ravens being seen together. As he remarks—"No doubt the destruction of the gray wolves will increase the usefulness of the eagles by forcing them to kill more of their meat, which will be rabbits" (MS).

Eagles are caught by the Indians, who use the feathers in their religious ceremonies. Two were seen in 1916 by Mr. M. P. Skinner at Zuni, living in captivity.

"At the San Jeronimo races of the Taos Indians in 1903, we found that eagle feathers were largely in evidence. Eagle down was thrown into the air when the racers first came up out of their khivas, and the hair and bodies of many of the runners were whitened with down. One or two had an eagle feather in the hair, and one at least had a feather on each ankle. Before starting on the relay race each runner took his position before one of the old men, who stroked his legs with an eagle quill to give him speed." The feathers are also used for ceremonial head-dresses. To have them at hand, the eagles are kept in cages. We saw them at Taos and they have been seen in several pueblos, among them, Sia and Jemez. To supply them, the Pueblo Indians as well as the Navajos, Mr. Jensen tells us, "have their 'eagle catchers'—men trained to capture the full grown birds." In describing their methods, he says "My Indian friends tell me that no traps are used, as these would bruise the eagles' legs. A hole about three feet square and from five to six feet deep is dug in the ground near a tree. The 'catcher' then places himself in the pit, which later is covered with limbs and turf, except for a small opening just large enough to slip the hand through. A dead rabbit is placed on top as bait, with a tame eagle as decoy. If a soaring eagle spies the tame eagle, it alights in the tree, and after examining the surroundings for some time, it darts for the rabbit. This is the concealed man's opportunity. He reaches out and catches the eagle by the legs and pulls it down into the hole, which is too narrow for the eagle to fight in" (1923b, p. 456). It seems hard that such noble birds of the sky should be caged, but the numbers taken are small and the religious ceremonies vital to the Indians.

The height to which eagles fly has been a matter of speculation, but an aeroplane recently collided with one at about 1,200 feet from the ground, which adds one fact to the discussion (Condor, 1927, p. 172).

A remarkable aerial evolution known as the "spring tumbling" of the Golden Eagle has been graphically described by Mr. E. S. Cameron. From his perch in a pine tree, the eagle, soaring skyward, "suddenly closed his wings, and dropped head foremost like a spent rocket, until the increasing impetus was checked by spreading them. After his first tumble the eagle shot upwards and repeated it, when he returned to the tree before resuming his aerial performance" (1908b, p. 252).

ADDITIONAL LITERATURE.—BREWSTER, WILLIAM, Bull. Mus. Comp. Zool., Harvard College, LXVI, 333-340, 1925.—CAMERON, E. S., Auk, XXII, 158-167, 1905; XXV, 251-268, 1908.—FINLEY, W. L., American Birds, 235-247, 1907.—OBERHOLSER, H. C., Biol. Surv., U. S. Dept. Agr., Bull. 27, 1906.

BALD EAGLE: *Haliaeetus leucocéphalus leucocéphalus* (Linnaeus)

PLATES 9 AND 14

DESCRIPTION.—*Male*: Length 30-35 inches, wing 20-25.9, extent about 7 feet, tail 11-15.2, bill 1.8-2.2, tarsus 2.6-3.4. *Female*: Length 34-43 inches, wing 23.5-28, extent about 7-8 feet, tail 12.5-16, bill 1.9-2.3, tarsus 3.2-3.7. Wing with six quills cut out on inner webs. *Feathering of leg not reaching foot.* *Adults*: *Head, neck, and tail pure white*, body blackish or dark brown; iris usually pale yellow or whitish; bill, cere, legs and feet corn yellow. *Young*: First year wholly black except white bases of feathers of under parts which gives spotty appearance; second or third year, head and neck blackish, lanceolate feathers of hind neck pale brownish, all feathers white beneath surface; rest of upperparts mixed gray, brown, black, and usually white; tail blackish, inner webs blotched with whitish; underparts mixed black and white; iris brown, bill and cere black or blackish, feet yellow.

COMPARISONS.—The juvenal Bald Eagle resembles the Golden Eagle so closely that they are often confused. The young Bald Eagle never has the "golden" hindneck. "The tail lightens toward the base with age, but always gradually, and never shows a definite tail bar as does the young Golden Eagle." The tarsus is bare for half its length. In flight the under surface is largely grayish toward the body (Taverner). (See Plate 9.)

RANGE.—Temperate and subtropical North America, chiefly in United States, south to southern Lower California, central Mexico and southern Florida, breeding in suitable localities throughout most of its range. Recorded from Queen Charlotte Islands.

STATE RECORDS.—East, west, and north, in the three States bordering New Mexico, the Bald Eagle is known to nest, and it has been reported to Mr. Ligon as nesting on the Frisco and east Gila Rivers. It is fairly common in western Socorro [Catron] County, he says. Nesting abundantly in the mountain parks of Colorado the Eagles are forced south when the ice shuts them off from a large part of their food. It is found throughout eastern Union County, though less commonly than the Golden Eagle, and one was seen in full plumage at Clapham, December, 1893 (Seton). One was seen in the Guadalupe Mountains at 6,500 feet, January 13, 1915 (Willet), and another in Socorro [Catron] County, 15 miles northwest of Reserve, January 27, 1915. A third had been killed 10 miles northeast, in Apache Canyon, three weeks previous (Ligon). A few were reported at about 8,000 feet on the Pecos



From Biological Survey (Robert Ridgway)

THE BALD EAGLE, OUR NATIONAL EMBLEM



as early as August 20, 1903 (Bailey); and a pair at El Rito, August 19, 1910 (Henderson); but usually they do not appear until much later and then are fairly common locally in the lower parts of the State. One was seen in the Datil Mountains, October 10, 1905 (Hollister); [one seen, October 15, 1917, and one October 4, 1918, near Carrizozo (Ligon)]; noted near Corona, October 25, 1902 (Gaut); near Socorro, November 17, 1846 (Abert); at Mal Pais Spring near Tularosa, December 23, 1902 (Gaut); during the winter at Fort Fillmore and Fort Thorn (Henry); and two in March, 1913, near Beaver Lake (Ligon). Three persons, Henry, Marsh, and Wilson, report them as rare near Silver City, where one was seen as late in the spring as May 1, 1884.—W. W. COOKE.

NEST.—On cliffs or in high trees, a bulky mass of sticks, lined variously with roots, grass, seaweed, rushes, turf, vines, or plant stalks. *Eggs*: Usually 2, white, unmarked.

FOOD.—Largely dead fish; also wounded waterfowl, squirrels, rabbits, prairie dogs; in some places, poultry and young stock; and, in times of necessity, carrion.

GENERAL HABITS.—The sight of the lordly white-headed Bald Eagle—our national emblem—flying across the width of a lake or standing perched on a lofty dead tree on the shore, glancing keen-eyed now in one and now in another direction, will not soon be forgotten, for he is a superb bird, the dominant figure in his landscape. One of the great birds seen by Mr. Ligon perched on a telegraph pole, used to the heavy artillery of the heavens, calmly maintained his position when a railroad train went thundering by below him.

Though his local food habits are not beyond reproach from the human point of view, he has much to his credit. On occasion, it is said, he plays the game gulls do with pelicans, intimidating the successful Fish Hawk until it drops its fish, when with superior speed he darts down and seizes it before it reaches the water! But his early training did not include the ten commandments! Moreover, the "close, firm, imbricated, oily" plumage of the Fish Hawk fits him peculiarly for diving, while the heavy body of the Bald Eagle enables him to fold his wings and drop down easily to catch the fish when it is once out of water. So each specialist may well follow his trade, the most expert little guessing that he is yielding to temptation!

The Bald Eagle's feathers like those of the Golden Eagle are used by the Indians. At Zuni, when on the Wheeler Survey, Mr. Henshaw saw about a dozen of the birds in wicker cages.

ADDITIONAL LITERATURE.—BREWSTER, WILLIAM, *Bull. Mus. Comp. Zool., Harvard College*, LXVI, 340-349, 1925.—HERRICK, F. H., *Auk*, XLI, 89-105, 213-231, 389-422, 517-541, 1924 (nesting).—POOLE, E. L., *Auk*, XLII, 209-216, 1925 (flight).—WALKER, E. P., *Bird-Lore*, XXIX, 157-160, 1927.

HARRIERS: Subfamily *Circinae*

MARSH HAWK: *Circus hudsonius* (Linnaeus)

PLATES 9 AND 15

DESCRIPTION.—*Length*: 19.5-24 inches, wing 12.9-16, tail 8.8-10.5, tarsus 2.8-3.2. Bill small; face encircled by an owl-like ruff of short feathers; plumage loose and of owl-like softness, wing with *four* outer quills cut out on inner webs,

second to fifth on outer webs; *upper tail coverts white in all plumages*. *Adult male*: Body ashy or bluish gray, streaked with white and becoming pure white on upper tail coverts and belly [this gull-like plumage is rarely seen]; *underparts white*, sparsely spotted with reddish brown; tail with four or six dusky bands; wings tipped with black, flight feathers barred; *wing linings white*; iris straw yellow, bill blackish, cere greenish or yellowish, legs and feet orange yellow. *Adult female*: Upperparts brown, in sharp contrast to white tail coverts; under parts buffy or whitish, vertically streaked with brown; under wings barred. *Young in juvenal plumage*: Upperparts similar to adult female but darker brown; underparts rusty brown, median parts, at least, unstreaked.

COMPARISONS.—See American Rough-legged Hawk, Comparisons, p. 171.

RANGE.—Breeds from northeastern Siberia, northwestern Alaska, northwestern Mackenzie, northern Manitoba, northern Ontario, central Quebec, and Newfoundland south to Gulf coast, Mexican border and northwestern Lower California; winters from southern British Columbia, western Montana, western South Dakota, southern Wisconsin and east to New Hampshire south to Bahamas, Cuba, and Colombia.

STATE RECORDS.—The Marsh Hawk is one of the most common hawks in the State but occurs mainly in migration and in winter. It was common from the first of August until October 24, 1913, near Koehler Junction (Kalmbach), but in the main arrives from the north in the latter part of August appearing first in the higher districts, soon after which it becomes common throughout the whole State from the lowlands to the tops of the highest mountains. Some early fall records are: Rock Lake, Jicarilla Reservation, August 4, 1913 (Ligon); Costilla River at 10,700 feet August 19, 1904, and the next day in Culebra Mountains at 13,000 feet (Bailey); between Clayton and Sierra Grande about August 14, 1903 (Howell); one near Pecos August 25, 1903 (Bailey); Diamond Creek, August 24, 1908 (Birdseye); Mesilla, August 24, 1913 (Merrill). [In 1917 on September 4, one was seen between Albuquerque and Socorro; September 5 and 6, ten were seen southwest of Magdalena (Ligon); and they are common during migration. In the region of Gallup, in the northwestern part of the State, it was noted September 29 and 30, 1916 (Skinner)]; about the Cimarron River in the northeastern part of the State November 5, 1915, several were observed (Ligon); [it was taken fifty miles south of Silver City, October 30, 1916 (Kellogg)].

They are most common during September and October and though most of the birds retire farther south for the winter a few remain at this season as far north as Arroyo Seco (Surber), and Albuquerque (Loring). Quite common, seen every day, near Clapham, October 27, and several seen November 5, 1893. At Perico, November 18, an adult male in blue plumage was seen; on December 28, 1893, one was caught in a wolf trap, and on January 3, 1894, one was found dead near a wolf bait (Seton). In the eastern foothills of the San Andres Mountains they remained common all the winter of 1902, when they were the most abundant of all the hawks (Gaut). On the Carlsbad Bird Reserve in January, 1915, they were the most abundant ones in the brush country of the lowlands; noted in the winter of 1915-16; [abundant December, 1916; and on the Rio Grande Bird Reserve noted twice, November 23-December 9, 1916 (Willetts)]. On January 5-7, 1919, great numbers were seen between San Simon and Carlsbad (Ligon).]

Judging from the dates of arrival in Colorado and Wyoming, the larger part of spring migration occurs in March and is completed in April, some individuals remaining to breed. [One was seen May 7, 1920, at Gray Ranch and one May 9, 1920, at San Simon, Hidalgo County, where it was doubtless nesting (Ligon);] one was noted at Albuquerque, May 11, 1901 (Birtwell); and a single male was seen in



From Handbook of Birds of the Western United States

MARSH HAWKS

The bluish male resting while the brown female beats low over the ground hunting for meadow mice

early June, 1899, near Roswell (Bailey). In the Pecos Valley, four were seen four miles south of Lake Arthur on Cottonwood Draw, June 25, 1913, and the species was noted northeast of Roswell, June 27, 1913 (Ligon). [At Lake Burford, May-June, 1918, a female was observed, but apparently did not nest (Wetmore).] On June 28, 1913, they were common on Salt Creek nesting in the big marshes at the mouth of Salt Draw, 18 miles northeast of Roswell, and [on June 16-21, 1918, two were again seen in the same locality. On May 30 at the Salt Draw, and June 6 and 7, 1924, in the White Lakes and Kenna sections, others were seen, some of which were undoubtedly breeding birds (Ligon).]—W. W. COOKE.

NEST.—Usually on the ground among bushes, rank grass, or rushes; on dry ground slightly made, on wet ground, a bulky mass of dried grass and sometimes twigs. *Eggs*: Usually 3 to 6, dull white, bluish, or greenish white, generally immaculate, but sometimes faintly spotted with pale brown or lilac.

FOOD.—Favorite general diet meadow mice, gophers, squirrels, young rabbits, and other rodents; but also lizards, snakes, frogs, and small birds, mainly the least useful ground-dwelling sparrows; but locally, "crouching birds—rails, snipe, grouse, hen pheasants"; also locally on the marshes, crippled, molting, and young waterfowl.

GENERAL HABITS.—In whatever plumage, whether the perfected, gull-like pale blue or bluish gray of the rare old male or the rusty brown of the female and immature, the Marsh Hawk can be recognized by its white upper tail coverts, as it beats low over the ground hunting for mice and other small rodents. One found in the San Andres Mountains had caught and eaten a kangaroo rat and one of the destructive cotton rats. At Carlsbad in the fall migration we saw one doing good work in an alfalfa field, and when going down from the junipers into the cultivated valleys we often saw them hunting over the ground. In the White Mountains, Mr. Hollister found them hunting at about 12,000 feet, near the summit of the range, evidently called there by the immense numbers of meadow mice inhabiting the grassy patches (MS). The Marsh Hawk is one of the especially important friends of the ranchman, ranking with the most beneficial hawks, and should be vigorously protected except where local conditions call for "local control under proper legal supervision."

Some interesting field notes on this "Citizen of the Marshes" are given by Dr. F. N. Wilson. As a male that he was watching was returning to his nest in the grass, he carried in his talons what looked like a mouse. "As he circled high over the nest, the female rose, and flying just beneath him, she reached upward and grasped the prey from his claws with her beak," carrying it quickly back to the young in the nest. At another time this efficient mother, on returning to the ground nest, found her independent brood in the shade outside. At sight of her, "the older ones crawled back; the younger ones she grasped with her beak just back of the head, and, in spite of their cries, replaced them one by one in the nest" (1927, pp. 399-401).

The courtship habits of these original hawks have attracted much attention, the male performing "in much the same manner as a tumbler

pigeon, falling from a considerable height in a series of somersaults, at the same time giving a musical rattling call; although on most other occasions it is silent" (Preble, January, 1927).

ADDITIONAL LITERATURE.—BAILEY, F. M., Bird-Lore, XVII, 431-438, 1915.—BREWSTER, WILLIAM, Bull. Mus. Comp. Zool., Harvard College, LXVI, 310-315, 1925.—JUDD, S. D., U. S. Dept. Agr., Yearbook Separate 194, 1900 (food of nestlings).—KALMBACH, E. R., Auk, XLIV, 100-101, 1927 (monetary value of Marsh Hawks).—PHILIPP, P. B., Educational Leaflet 8, Nat. Assoc. Audubon Soc.—SAUNDERS, A. A., Condor, XV, 99-104, 1913.

OSPREYS: Subfamily Pandioninae

"The semi-aquatic, piscivorous habits of these fishing hawks require a water-proof covering, and great talons to grasp their slippery quarry" (Coues). Their plumage is, accordingly, close, firm, imbricated, and oily, while their feet are large and strong, the toes free to the base, the outer one reversible, their grasping surface thickly beset with spicules, and their claws large, sharp, and of equal length.

AMERICAN OSPREY: *Pandion haliaetus carolinensis* (Gmelin)

PLATE 9

DESCRIPTION.—Length: 20.7-25 inches, wing 17-21, extent about 65 inches, tail 7-10, bill 1.2-1.4, tarsus 1.9-2.4. Wing with four quills cut out on inner webs.



Adults: Head, throat, and underparts white, side of head with black streak, breast spotted, most heavily in female; upperparts dark brown; tail with 6 to 8 obscure bands; wing quills black, marked with white, wing linings white, spotted; wrist marks heavy; iris yellow or red, bill blackish, cere, legs and feet bluish. Young in juvenal plumage: Similar to adults but feathers of upperparts edged with white or buffy, tail more regularly barred, and underparts more or less buffy.

RANGE.—Breeds from northwestern Alaska, northwestern Mackenzie, northern Manitoba, southern Quebec, and Newfoundland south to southern Florida, Gulf coast, western Mexico, and Lower California; winters from southern California, the Gulf States, and Florida south through the West Indies, Central America, and Mexico; occurs also in South America south to Peru, Ecuador, and Paraguay.

From Biological Survey (J. L. Ridgway)

FIG. 28. Osprey

Sometimes mistaken for the Bald Eagle whose head and tail are white and entire body blackish

STATE RECORDS.—The Osprey breeds in favorable localities throughout North America and there is no reason to suppose that it does not nest occasionally in New Mexico. [Only two nests have been recorded, one found April 24, 1916, on the West Fork of the Gila River, about 50 miles north of Silver City; and another found August 18, 1920, at Falls on the West Fork of the Gila River about 45 miles northwest of Pinos Altos at 7,500 feet (Ligon).] It is known as a rare migrant and recorded from Forts Fillmore, Webster, and Thorn (Henry), Silver City (Kellogg), Apache (Anthony), Roswell (Barber), Rinconada (Surber), and Willis (Henshaw), thus occurring from 3,500 to 8,000 feet.

It was seen at Roswell in 1898 as late as October 27 (Barber). It is never common in the State owing to the general lack of conditions suitable to its special needs.—W. W. COOKE.

NEST.—Usually near water, on top of a dead tree or stub, but sometimes on the ground, on pinnacles, cliffs, a chimney, a windmill or a rocking buoy. A bulky mass of sticks and weeds lined with softer materials as seaweed or cedar bark, increasing in size by yearly repairs and additions till 6 to 8 feet in diameter. *Eggs*: Usually 3, varying from white to reddish, generally heavily spotted and blotched with brown.

FOOD.—Fish; apparently about half, those of little or no use to man.

GENERAL HABITS.—While the Osprey lives largely on menhaden, herring, goldfish, sunfish, and other kinds that may well be spared, it contributes to the welfare of communities by eating easily caught diseased fish that might otherwise be taken by fishermen.

Approaching the Bald Eagle in popular interest, and indeed often mistaken for it, its great nests attract the attention of bird photographers. One of the two nests so far recorded from New Mexico for this unique bird, all too rare in the State, was found by Mr. Ligon on the top of a dead pine snag about forty feet from the ground in the bed of Gila Canyon, and the other on the Gila in a tall green pine. On San Clemente Island, California, a colony of twelve or fourteen Ospreys have been reported, the majority of their nests—some immense piles of sticks and kelp four to six feet high—capping columns of rock picturesquely standing directly in the surf. And in the famous canyon of the Yellowstone, large numbers nest, finding safe unapproachable nesting sites on the peak of the richly-tinted minarets, near good fishing grounds at the foot of the falls, the presence of the big striking birds adding a feature of peculiar interest to that remarkable region.

In Lower California, where a pair of these beautiful hawks fished daily along the ocean near Mr. Huey's camp, "it was not unusual to see them devouring their prey while perched on the top of a lone giant cactus" (1927, p. 26).

ADDITIONAL LITERATURE.—ALLEN, C. S., *Auk*, IX, 315, 1892.—BRADBURY, W. C., *Condor*, XIX, 149-155, 1917.—BREWSTER, WILLIAM, *Bull. Mus. Comp. Zool.*, Harvard College, LXVI, 364-367, 1925.—CHAPMAN, F. M., *Bird-Lore*, X, 153-159, 1908; *Camps and Cruises*, 46-60, 1908.—GIGNOUX, CLAUDE, *Condor*, XXII, 205, 1920.—PECK, F. C., *Bird-Lore*, XXVII, 231-233, 1925 (young).—RAY, M. S., *Condor*, XVII, 70-74, 1915.—SKINNER, M. P., *Condor*, XIX, 117-121, 1917; *Amer. Mus. Journal*, XVII, 130-131, 1917; *Roosevelt Wild Life Bull.* III, 64-66, 1925.

FALCONS AND CARACARAS: Family Falconidae

In the Falcons the beak is sharply hooked and toothed, the lower mandible truncate, the nostrils circular with a central bony tubercle; in the Caracaras the bill is not toothed and the nostril is oblique, though it has a central tubercle. Other anatomical characters ally the Falcons and Caracaras although in the Falcons only one or two wing quills are

falcate, cut out, and in the Caracaras three or more; in the Falcons the feet are armed with long curved talons, while in the Caracaras the claws are short and weak. The Falcons are medium-sized muscular birds of strong swift flight and raptorial habit, their prey usually being pursued and captured in the air; while the Caracaras are large, rather sluggish and chiefly terrestrial vulturine birds, living largely on carrion.

CARACARAS: Subfamily Polyborinae

AUDUBON CARACARA: *Polyborus Cheriway auduboni* Cassin

DESCRIPTION.—*Length:* 20.5–25 inches, wing 14.6–16.5, tail 8.8–10, bill 1.2–1.4, tarsus 3.2–3.7. Bill without tooth; wing with four quills cut out. *Adults:* Skin of face *nearly bare*; crown, horizontal crest and body *blackish*, contrasting sharply with *white* of sides of head and neck; wing quills marked with white, and tail white with 13 or 14 narrow dusky bars and wide black terminal band; iris brown, bill pale colored, cere carmine; feet yellow. *Young:* Similar, but brownish, body streaked vertically, tail cross-barred.



FIG. 29. Caracara

RANGE.—Tropical and subtropical Zones of northern Lower California, Arizona, New Mexico, Texas, and Florida south to Guiana and Ecuador.

STATE RECORDS.—The Caracara is a tropical species coming north to the extreme southern United States. Its first record for New Mexico is that of a single specimen taken at Fort Thorn during the coldest part of the winter of 1856 (Henry). It was not noted in the State again until 1914, when one was taken May 4, at Mesquite (Church), the skin being sent to the museum of the State College.—W. W. COOKE.

NEST.—In trees and bushes as yuccas, mesquites, and cactuses, made of sticks and leaves. *Eggs:* 2 or 3, "heavily colored with blotches and clusters of rich reddish brown and smaller blackish over-spots, usually obscuring the creamy white ground color" (Coues).

FOOD.—Carrion, rabbits, mice, prairie dogs, and other small rodents; fish, frogs, lizards, snakes, beetles, and grasshoppers.

GENERAL HABITS.—The Caracara combines some of the essential characters of both falcons and vultures, being a vulture-like, terrestrial carrion hawk, often seen perching on the tops of telephone poles. This interesting bird, called the Mexican Eagle, recognized on sight by its long neck and legs and singular color pattern—black cap, high white muffler, and blackish cloak—is the national emblem of Mexico and figures on the flag with a rattlesnake in its bill.

While a scavenger like the true vultures, the Caracara chases rabbits, runs after wounded coots, steals fish from pelicans, and catches lizards and snakes. One was discovered by Major Bendire, as he says, "engaged in quite an encounter with a good sized snake which had partly coiled itself about its neck, both bird and snake struggling for a few minutes at quite a lively rate. The Caracara had the best of the fight, however," and before the Major could get to the place, the

bird was off with its quarry, the snake still squirming and twisting about in its talons (1892, p. 317).

ADDITIONAL LITERATURE.—SCHULTZE, A.E., Condor, VI, 106-108, 1904 (nesting).

FALCONS: Subfamily Falconinae

"The Falcons were known to the old falconers as the Noble or Long-winged Hawks, and, on account of their great spirit, strength, and address, were the chosen birds for use in hunting. Their long wings give them great speed and their endurance permits them to maintain it. They are bold and strong and capture their prey by sudden swoops when possible, but, unlike the *Accipiters*, are not discouraged when their stroke misses. They first rise above their prey by means of a long spiral climb. Once above, they drop like a bullet, striking with their powerful talons as they do so. The flight of the Falcons is quite recognizable—pointed wings and quick strokes with very little sailing. Seen in the hand, the upper mandible furnished with a tooth will always separate the Falcons from other Hawks" (Taverner).

PRAIRIE FALCON: *Fálco mexicánus* Schlegel

PLATES 9 AND 16

DESCRIPTION.—*Male*: Length about 17-18 inches, wing 11.6-12.5, tail 6.4-7.5, bill .7, tarsus 1.8-2.1. *Female*: Length about 18.5-20 inches, wing 13.2-14.3, tail 8-9, bill .8-.9, tarsus 2-2.4. Bill toothed; wing with only one quill cut out. *Adults*: Upperparts pale clay brown, feathers with paler borders; tail tipped with white and more or less distinctly barred; wing quills ashy brown, marked with white; axillars dark brown, wing linings white, spotted; underparts white, streaked, except on throat; bill bluish horn-color, base and much of under mandible, yellow; feet yellow. *Young*: Upperparts grayish brown, feathers edged with rusty; underparts buffy, with broader streaks; feet plumbeous.

COMPARISONS.—Of the six Falcons recorded from New Mexico, the three small ones—the reddish brown and blue Western Sparrow Hawk and the two forms of bluish Pigeon Hawk (*columbarius* and *richardsoni*)—are only 10-12 inches long; the three larger ones—the brown Prairie Falcon, bluish Duck Hawk, and bluish Aplomado Falcon—range from 15 to 18 inches in length. In the Prairie Falcon and the Duck Hawk only one wing quill is cut out; in the Aplomado, as in the three smaller Falcons, two quills are cut out.

RANGE.—Transition and Sonoran Zones from southern British Columbia and southeastern Saskatchewan to eastern border of Great Plains and south to southern Mexico and Lower California; casual east to Minnesota and Illinois. Breeds throughout its normal United States range.

STATE RECORDS.—[The Prairie Falcon nests and is resident at many points in the State—near Santa Rosa, at Lake Burford, on the edge of the San Augustine plains, west of Magdalena, northeast of Fair View, near the mouth of the West Fork of the Gila, and about Lamy (Ligon).] A pair was feeding young May 26, 1903, in a nest near the top of a high cliff above the Pecos River near Santa Rosa, and on June 17, 1903, three nearly grown young were seen in a nest in a niche on the face of a 70-foot cliff near Montoya (Bailey). [At Lake Burford, May 23-June 19, 1918, a nest with young was found in the canyon below the lake (Wetmore). Near La Bajada Hill in

Santa Fe County, in April, 1921, a pair was nesting (Jensen).] A nest with fresh eggs was found April 6, 1913, at 7,200 feet near Beaver Lake; another nest with fresh eggs found May 1 near the first was probably the second set of this pair of birds. A third nest with incubated eggs was found April 29 not far distant indicating that two pairs were inhabiting these cliffs. [Adults and young were seen, June 28, 1920, 35 miles southwest of Chloride at 7,000 feet (Ligon).] In addition to these records of actual breeding, the species has been seen during the summer under conditions that made it probable that it had nested not far distant; between Tres Piedras and Taos July 8, 1904; several between Roswell and the Capitan Mountains June 8-19, 1899 (Bailey); one at about 4,800 feet in the lower foothills of the Big Hatchet Mountains July, 1908 (Goldman); while it was reported as not rare in summer near Las Vegas (Mitchell).

In the fall migration it is fairly common, the southward movement beginning in early August, and at this period it was noted as high as 9,400 feet in the Costilla River Valley, August 23, 1904 (Bailey). Near Koehler Junction, it was quite common, especially July 31, September 1, 4, and October 2 (Kalmbach). One was seen September 30, 1904, at Lake Burford (Bailey). Of those that winter in New Mexico, it was seen January 5, 1901, at Albuquerque (Birtwell), [noted on the Carlsbad Bird Reserve, December, 1916 (Willett); taken in Socorro County, January 24, 1917 (Kellogg); several seen in the Carlsbad region, January 5 to 7, 1919, and three seen near Fort Sumner, January 11, 1919 (Ligon).] On the return in the spring one was taken March 22, 1892, on the southern boundary 60 miles west of El Paso (Mearns). —W. W. COOKE.

NEST.—Usually in crevices and holes in perpendicular cliffs. *Eggs*: 2 to 5, generally creamy white, thickly blotched, mottled, and clouded with reddish-brown.

FOOD.—Birds, mammals, reptiles, and the larger insects. The stomach of a young one still in the nest contained the remains of a meadowlark and of rock and ground squirrels. "Good and bad habits about balanced; takes game birds and also pernicious rodents" (Henderson).

GENERAL HABITS.—Several of the spirited clay-colored Prairie Falcons were seen flying about the alfalfa fields at Carlsbad in September, apparently looking for game among the flocks of waders that followed the irrigation of the fields. When the waders were quietly feeding, the appearance of this dark, short-necked hunter would send a big flock of the silvery birds into the sky, or if he dashed in among them, would put them to disorderly flight.

A Ring-necked Pheasant that was once attacked by one was so terrified that, at each swoop of the Falcon, it would flatten itself against the ground.

At Lake Burford Doctor Wetmore watched a pair nesting on an inaccessible ledge high up on the sandstone cliffs bordering the canyon below the lake, which frequently came across to hunt along the lake shore. They harried the Yellow-headed Blackbirds so mercilessly that they "set up an outcry whenever a bird of any size appeared on the skyline. Near their nest the Falcons frequently perched in dead trees as well as on the rock ledges. The nest was easily located by watching and following the adults, but was on a rock shelf where it could not be reached without ropes" (1920a, p. 398).



Courtesy of the Cooper Ornithological Club

PRAIRIE FALCON

Looking up to his mate high overhead, to whose nestlings, safe on a shelf of a cliff, he will carry his quarry—the handsome Gambel Quail of the desert

Prairie Falcons were occasionally seen by us near characteristic nesting grounds—sandstone mesas or valley walls and side canyons like those of the Chama, with sandstone rim rock in which a stream of white-wash would guide the eye to the nest shelf. Two were seen a few miles below Lake Burford beating low over the park floor at the base of the cliffs, and one was seen dashing across a marsh making the small birds scatter before him. On the cliffs of the headland marking the highest point of the Staked Plains, we found a family of three young nearly ready to fly and one of them stood impassively watching us while their parent flew anxiously over our heads and circled around the cliffs with their strong steady wing beats. On Pecos Baldy, a falcon, apparently the Prairie, was seen beating up against a storm that was coming over the mountain, as if attempting to reach a sheltering niche in the rocks under the peak.

ADDITIONAL LITERATURE.—DAWSON, W. L., Condor, XV, 55-62, 1913.—FUERTES, L. A., Condor, VII, 35-36, 1905.—PEABODY, P. B., Condor, IX, 180-184, 1907.—RICHARDS, GEORGE, Condor, XI, 164-166, 1909 (nest).—TYLER, J. G., Condor, XXV, 90-97, 1923.

DUCK HAWK: *Fálico peregrínus ánatum* Bonaparte

PLATE 9

DESCRIPTION.—*Male*: Length 15.5-18 inches, wing 11.3-13, tail 6-7.5, bill .7-8, tarsus 1.6-1.9. *Female*: Length about 18-20 inches, wing 13-14.7, tail 6.9-9, bill .8-1, tarsus 1.9-2.2. Upper mandible strongly toothed; wings long, pointed, only one quill cut out. *Adults*: Top of head and "moustache" black in striking contrast to white or buffy of side of head, throat, and breast; back dark bluish gray or slaty plumbeous marked with dusky, tail coverts lighter, bluish; tail crossed by six or more light bars; wing quills blackish, spotted; under sides of wings and tail closely spotted or barred; lower underparts spotted or barred; bill mainly blue-black, iris dark brown, naked orbital ring, cere, legs and feet lemon yellow. *Young in juvenal plumage*: Upperparts brownish or blackish, with light brown feather edgings and tips; tail dark, usually crossed by light bars; under parts buffy, vertically streaked with black; iris dark brown, naked eyelid, base of bill, cere, legs and feet wax yellow (Allan Brooks).



From Biological Survey
(J. L. Ridgway)

FIG. 30. Duck Hawk

RANGE.—Breeds locally (except Pacific coast from Alaska to Oregon) from Norton Sound, Alaska, northern Mackenzie, Boothia Peninsula, and Greenland south to Connecticut, Pennsylvania (in Appalachian Mountains to Tennessee), southern Illinois, Kansas, central-western Texas, Arizona, central Mexico, and central Lower California; winters from Vancouver Island, Colorado, southeastern Nebraska, east to Massachusetts and south to West Indies and Panama; occurs also in Porto Rico and most of South America.

STATE RECORDS.—In all the years of Henry's collecting in New Mexico he secured only one specimen of the Duck Hawk and that was in the Capitan Mountains

near Fort Stanton. One was seen at Beaver Lake, August 27, 1908 (Birdseye). [On the Rio Grande Bird Reserve one was seen December 4, 1916 (Willett); between Silver City and Deming, one was seen August 26, 1917 (Ligon); at Lake Burford a family of young left the nest about June 10, 1918 (Wetmore); about 30 miles east of Carlsbad one was noted, January 9, 1919 (Ligon); and during May, 1921, a male was seen several times about a mile west of Santa Fe (Jensen).]—W. W. COOKE.

NEST.—Usually overlooking water, on cliffs, in niches of cut banks, or in hollows in high trees. *Eggs*: Deposited on bare ledge or ground, generally 3 or 4, creamy ground color often obscured by confluent markings of chocolate brown; others variegated or almost wholly reddish brown.

FOOD.—Mainly birds, and principally waterfowl and shorebirds; also poultry. "Feeds to some extent on insects and mice, but on the whole is more harmful than useful" (Fisher).

GENERAL HABITS.—At Lake Burford Doctor Wetmore found that "a pair of these swift-flying falcons had a nest in the canyon south of the lake, and the adults were observed hunting at the lake and in the open country around it. The young left the nest about June 10, and were heard calling from rocky points nearby for a day or two afterward" (1920a, p. 398).

The flight of the Duck Hawk is so rapid that, as Doctor Fisher says, it is able to overtake the swift-winged ducks with comparative ease, and it is so bold and audacious that it will attack and kill prey twice its weight (1893, p. 108). A pair were found by Colonel Roosevelt at Oyster Bay, working ruthless havoc among a colony of Black-crowned Night Herons. Another pair were seen by Mr. Huey in Lower California "harassing a bunch of Snow Geese high overhead" (1927, p. 26). They do not disdain smaller prey, however. One seen by Doctor Cooper was pursuing a swallow, and as if the size of his quarry permitted him to indulge in aeronautic stunts, he turned on his back and seized the swift-flying swallow as it passed.

Pigeons are among the Duck Hawk's favorite articles of diet, sometimes attracting them into cities. One and sometimes two of the Hawks have spent a term of winters in Washington, D. C., making their headquarters in the tower of the post office department, where the unsuspecting pigeons came to roost; also frequenting the neighborhood of Center Market, and altogether catching so many pigeons that one of the marauders was finally shot. When the pigeons became so numerous that there was need of some natural check, it was too late. In the winter of 1925, however, one Duck Hawk was seen near the post office tower catching Starlings that were going to roost in the city streets. Two of the Hawks also spent some weeks of the winter of 1918, Mr. D. E. Culver states, in the heart of Philadelphia (1919, pp. 108-109). In cities where they can do little harm, these spirited hawks bring a touch of wild life pleasurable, indeed, to nature lovers.

ADDITIONAL LITERATURE.—BREWSTER, WILLIAM, Bull. Comp. Zool., Harvard College, LXVI, 349-355, 1925.—DIXON, JOSEPH, Condor, X, 198-200, 1908 (young).—RICHARDS, V. F., Auk, XXXVI, 349-350, 1919 (young).—TYLER, J. C., Pacific Coast Avifauna No. 9, 44-46, October 1, 1913.

APLOMADO FALCON: *Fálco fúsko-coeruléscens septentrionális* Todd

PLATE 9

DESCRIPTION.—*Male:* Length about 15 inches, *wing* 9.2-10.7, tail 6.3-8, bill .6-.7, tarsus 1.7-1.8. *Female:* Length 17-18 inches, wing 11-11.6, tail 7.8-8.8, bill .7-.8, tarsus 1.8-2, Wing with 1st and 2d quills cut out on inner webs; 2d and 3d sinuate on outer webs. *Adults:* Upperparts plain bluish or leaden gray; side of head black with a broad white or tawny *postocular stripe*, becoming orange brown on nape; tail tipped with white and crossed by about eight narrow white bands; wing with one white band, primaries and secondaries barred; throat and chest white; sides and variable abdominal band blackish, barred with white. *Young:* Similar, but upperparts dark brown and breast striped with blackish.

RANGE.—Arizona, New Mexico, and southern Texas south through Central America to Argentina.

STATE RECORDS.—The Aplomado Falcon was added to the fauna of the United States by Dr. A. L. Heermann who took a fine adult in southwestern New Mexico in 1853. No date has been given for the capture, but Lieut. Park's party, to which Heermann was attached, entered New Mexico on March 4 and reached the Rio Grande March 12, so that the specimen must have been taken between these dates. A pair was seen June 2, 1886, near Hachita (Anthony); one was taken April 9, 1892, at Lake Palomas just south of the New Mexico boundary (Mearns); one was secured July 15, 1908, at Hachita, and another one seen August 21, 1908, near the Old Hatchet Ranch in the Playas Valley (Goldman). A nest containing feathered young was found June 17, 1909, 10 miles east of Rincon, and several other nests in the adjacent Jornada during this and the preceding year (Ligon). [At 25 miles north of Engle, two were seen, August 27, 1917, and 10 miles northeast of Engle, one seen, December 23, 1918 (Ligon); 20 miles southeast of Silver City one was seen September 22, 1918, and 30 miles southeast on an irrigation pond of the Rio Mimbres, one was taken May 25, 1919, and at Separ, Grant County, three were taken, June 15, 1924 (Kellogg).] It is thus seen that the species in New Mexico is confined to the southwestern part of the State and it probably does not remain here through the coldest part of the winter.—W. W. COOKE.

NEST.—In mesquite, yucca, or cactus, a platform of twigs and plant stalks, usually lined with grass. *Eggs:* Generally 3, white, variably dotted with light brown and overlaid with blotches of dark brown.

FOOD.—Small reptiles, mice and other rodents, dragon flies, grasshoppers, and other insects, seeds, and an occasional bird.

GENERAL HABITS.—A tropical species, the Aplomado Falcon comes north with the yucca, mesquite, and cactus plains of the Southwest, but one individual has been reported in the State in December, when the ground was covered with snow and it was very cold. On rare occasions it is seen about Brownsville, Texas, and it is quite common between Brownsville and Point Isabel, Texas, among the tree yuccas of a sandy ridge where locusts, lizards, and snakes abound. Like the Sparrow

Hawk it hovers in mid-air to locate its prey on the ground below, and its flight is said to be light, powerful, and easy.

In Paraguay, where Doctor Wetmore found it frequenting the open savannas, in one place "the sight of these little falcons brought consternation to the screeching flocks of monk parakeets that fed in . . . old sweet-potato fields" (1926a, p. 103).

PIGEON HAWK: *Fálco columbárius columbárius* Linnaeus

PLATE 9

DESCRIPTION.—*Male:* Length about 10-11 inches, wing 7.4-7.8, tail 4.6-5.2, bill .5, tarsus 1.3-1.4. *Female:* Length about 12.5-13.2 inches, wing 8.3-8.6, tail 5.3-5.5, bill .5-.6, tarsus 1.5-1.6. Wing with *two outer quills cut out; tail having not more than four wide blackish or five narrow light bands.* *Adult male:* Upperparts bluish interrupted by streaked rusty or buffy nuchal collar, and feathers of back with black shaft streaks; wing quills blackish marked with white; throat usually white, rest of underparts tinged with tawny or ochraceous, vertically streaked (spotted or barred on flanks) with dark brown; iris brown, bill bluish, cere, legs and feet yellow. *Adult female and young:* Color pattern similar but upperparts dark brown, and underparts with whitish or buffy prevailing.



From Biological Survey
(J. L. Ridgway)

FIG. 31. Pigeon Hawk

COMPARISONS.—See Sharp-shinned Hawk, Comparisons, p. 158.

RANGE.—Breeds from northwestern Alaska and northwestern Mackenzie south except in Pacific coast region, in mountains to California; and from Ontario, northern Quebec, and Newfoundland south to Maine, southern Ontario, northern Michigan, and Minnesota; winters from southern British Columbia, southern Colorado, Nebraska (one specimen from Ottawa), and east to Massachusetts south through Mexico, Central America, and West Indies to Ecuador and Venezuela.

STATE RECORDS.—As a migrant, the Pigeon Hawk was reported as not uncommon on the upper Pecos near Willis the fall of 1883 (Henshaw), was twice seen at Shiprock (Gilman), and once noted near Tres Piedras, August 1, 1904 (Gaut). It was taken near Lake La Jara, September 18, 1904, and near Tularosa, November 5, 1902 (Gaut), [one was taken 25 miles south of Albuquerque, October 30, 1917 (Leopold); others were taken near Silver City, November 2, 1919, November 14, 1920, November 2, 1922, and October 19, 1924 (Kellogg).]—W. W. COOKE.

NEST.—Commonly in coniferous trees, in hollows or on branches, but also on ledges of cliffs; slight or bulky, according to location. *Eggs:* 4 to 7, varying from white, with a few indistinct spots, to nearly uniform rich brown.

FOOD.—Mainly birds, grasshoppers, dragon flies, and other insects, and occasionally injurious mammals. "Good and bad habits balanced" (Henderson).

GENERAL HABITS.—The "intrepid" little Blue Corporal or Bullet Hawk, as the Pigeon Hawk is locally known, frequents the edges of woods and shores of large bodies of water, where it preys upon birds up to its own size and sometimes larger.

A specimen taken at Lake La Jara on September 18, 1904, was in fresh fall plumage with just a trace of abrasion on the tip of the tail. The skin at the base of its bill, and its upper eyelid, were bright lemon yellow. Its stomach contained the feet and feathers of a small bird.

In southeastern Alaska, Mr. Alfred M. Bailey found "these fast flying little Hawks . . . fairly plentiful during the fall migration, when both young and adults are to be noted. They were most numerous during September, high above timberline, where they were sailing over the mountain tops, or swooping low over rugged crests as they hunted for food" (1927, 205).

ADDITIONAL LITERATURE.—BREWSTER, WILLIAM, Bull. Mus. Comp. Zool., Harvard College, LXVI, 355-362, 1925.

RICHARDSON PIGEON HAWK: *Fálco columbáriuș richardsoni* Ridgway

DESCRIPTION.—Similar to the Pigeon Hawk, but lighter and slightly larger; *middle tail feathers with five dark and six light bands.*

RANGE.—Breeds in Great Plains region from middle Saskatchewan and southern Alberta to Manitoba (3 records, Taverner), North Dakota, and northern Montana (probably northern South Dakota and northern Wyoming); winters south to southern Lower California, northwestern Mexico, and southern Texas; casual in California and Missouri.

STATE RECORDS.—One Richardson Pigeon Hawk was killed and three others seen at Coleman's Ranch near Silver City in midwinter about 1904 (Hunn), and a female was taken at Perico, November 20, 1893 (Seton), but these are apparently the only records for New Mexico. Since the bird's breeding grounds lie directly to the north, in the northern United States and southern Canada, and the species does not go much farther south than New Mexico to spend the winter, it is probable that it is not rare locally in the State at this season.—W. W. COOKE.

DESERT SPARROW HAWK: *Fálco sparvériuș phalaéna* (Lesson)

PLATES 9 AND 11

DESCRIPTION.—*Male:* Length 8.7-10.6 inches, wing 7.5, tail 5.3, bill .5, tarsus 1.5. *Female:* Length 10.7 inches, wing 7.7, tail 5.3, bill .5, tarsus 1.5 (Mearns, average of 13 adult males, of 11 adult females, Auk, IX, 265, 1892). Wing with two outer quills cut out. *Adult male:* *Side of head with two vertical black stripes; crown mainly rufous, buffy brown* (summer) or (winter), bordered with bluish gray, wing coverts *bluish gray*; rest of upperparts *buffy brown or pale cinnamon-rufous*, back and wings spotted with black, *tail with black subterminal band and light tip*; underparts buffy, spotted on sides; bill bluish at base, darkening to blue-black at tip; cere and edges of bill greenish yellow in young, becoming yellow or orange-yellow in adults; legs and feet yellow, deepening with age. *Adult female:* Similar but duller and *back, wings, and tail barred with dusky.* *Young:* Similar to adults, of same sex.

RANGE.—Breeds from central British Columbia and southwestern Saskatchewan, Wyoming, and western Nebraska south to western Texas, Durango, New Mexico, and southern California; winters occasionally from British Columbia and Colorado south to Guatemala.

STATE RECORDS.—The most widely distributed hawk of the State, the Desert Sparrow Hawk occurs throughout the whole of New Mexico from the lowest, hottest

valleys to the upper parts of the highest mountains, being common over all mountainous and timbered parts of the State, but the nests are made for the most part in the middle altitudes from 5,000 to 7,000 feet. [It is a common resident at Silver City, 5,800 feet, and eggs were taken April 21, 1927 (Kellogg).] It nests commonly at Mesilla, 3,800 feet (Merrill); nests with eggs were noted May 12, 1913, at Cottonwood Spring near Elephant Butte, and it is a common breeder at Fort Sumner 4,200 feet (Ligon). Nests were found at Santa Rosa May 26, 1903, and at about 6,500 feet on the Rio Mimbres, May, 1906; young out of the nest were being fed by the parents at Cuervo June 13, 1903, and at Glorieta July 7, 1903, while young were still in the nest in Pueblo Canyon July 15, 1904, at 7,000 feet (Bailey). The birds were seen under such conditions as to indicate breeding at Tres Piedras, Fort Wingate, Chloride, the base of the Capitan Mountains at about 6,500 feet, and on Mesa Yegua June 25, 1903, at 7,300 feet.

After the nesting season near Koehler Junction, it was very abundant, July 28–October 24, 1913 (Kalmbach). In the fall it ranges to the top of the highest mountains; one was seen August 11, 1903, flying over Truchas Peak above 13,300 feet (Bailey). On September 15–16, 1914, one was noted in the valley of Luna (Goldman), and in Union County at Perico, on October 26, two were seen; on October 27, one, and on November 5, 1893, several, after which none were seen (Seton); in other parts of the county several were seen November 5, 1915 (Ligon). [On August 28, 1917, it was noted between Socorro and Albuquerque (Ligon); September 30, 1916, one was noted near Gallup; October 1, one at White Water Creek; October 4, another near Zuni (Skinner).]

A few remain in the State through the winter, more commonly at the lower elevations as at Arroyo Seco (Surber), Espanola, 5,900 feet (Loring), San Andres Mountains (Gaut), Gila Forest Reserve (Ligon), and Mesilla (Merrill). In the vicinity of the Carlsbad Bird Reserve it was seen several times in January, 1915, and was noted in the winter of 1915–16 [and in December, 1916; on the Rio Grande Bird Reserve, two December 8, 1916 (Willett); and at Engle, one, December 6, 1918 (Ligon)].—W. W. COOKE.

NEST.—Usually in hollow trees, and often in old woodpecker holes but sometimes in holes in cut banks, cavities in cliffs, about buildings and in nesting boxes. *Eggs*: 3 to 7, creamy white to rufous, usually buffy or yellowish brown, generally finely and evenly marked with shades of the ground color and blotched variously with browns.

FOOD.—In summer mainly grasshoppers and crickets—one stomach contained 21 grasshoppers and July 28–October 4, in Colfax County, 90 per cent of the food was grasshoppers (Kalmbach)—when these are not available, ants, beetles, and other insects, snakes, lizards, small mammals such as mice (in winter, mainly mice) and gophers, also occasionally wild birds or young chickens. In the Zuni Mountains, in July, the stomachs examined by Mr. Hollister “were crammed with small grasshoppers and black crickets and in one case a large cicada” (MS).

GENERAL HABITS.—An adult male Desert Sparrow Hawk is an individual bird. When seen looking out of his nest hole in a tree trunk his black cheek stripes show well, and when standing on a fence post in the sun his blue and rufous head and back make a handsome combination. Even the nestlings have bright touches of color, for while the iris is brown, the skin around the eye is lemon-yellow, and the cere, legs and feet are also yellow.

The name Sparrow Hawk is a misnomer as Mr. Preble says, probably applied by the early English colonists “because of its fancied resemblance

to their own small hawk: Grasshopper Hawk would be a more fitting term" (1927, p. 3).

Near Mesilla Park, Professor Merrill reports, the small Hawks are not only numerous but so tame as to be almost birds of the dooryard. They are resident and breed early, but, as he says, "the young depend mainly on the old for food long after they are able to fly well. Their begging squeals are heard all day if there are any individuals near. While nesting usually in holes and crannies, one pair made a nest in a mesquite bush near the college grounds on the mesa and raised three young."

The little Sparrow Hawks are seen commonly on the electric light wires and poles of the college grounds and one pair was discovered by Professor Merrill, engaged in an amusing courtship. The female was perched on a cross arm of a light pole when the male appeared in air high overhead, and hovered there, both birds squealing vociferously. Dropping back behind a mesquite bush he caught a lizard and flew to her with it in his beak. But instead of accepting his offering, she ungraciously pecked him on the head! "At this he moved away to a safer distance and both began the squealing again, at the same time gesticulating wildly with their heads and bodies. Gaining courage the male once more approached with the lizard. This time the female took it in her bill and immediately and coquettishly dropped it to the ground. A true gallant, the suitor flew down and picked it up again but flew to the next pole to alight. Here he preserved a dignified mien and stern quiet for some minutes, when the fickle lady-love ceased her clamor and flew to the opposite end of his cross arm. At once he took up cry, alighted beside her and offered the lizard again." This time she readily accepted the offering and the suit was won (MS).

At Taos two nearly grown nestlings brought from their tree to our camp by an Indian, when put on a camp-stool and playfully threatened with the hand showed their fighting blood amusingly, the little male throwing himself back and with raised head striking out with his well armed claw in spirited pose.

At Lake Burford Doctor Wetmore saw one pursuing a Magpie through a grove of cedars, striking at it repeatedly. These little falcons, he says, "delight in playing with other hawks and were seen darting down at Red-tails and Cooper Hawks as they circled about in the air" (1920a, p. 399).

The temerity of the Sparrow Hawks is well illustrated by a case reported by Mr. Shorger from Louisiana where they took advantage of a forest fire in the long-leafed pines. "The fire drove out both insects, small reptiles and rodents, and in spite of the great heat and intense black smoke arising from the resinous wood, the birds would not only dash past within a few feet of the flames, but would actually alight on

stubs and fallen branches in smoke so thick that they were frequently lost to view. In the vicinity of every fire observed, Hawks were present, and as many as twenty individuals were noted at one time" (1917, p. 209).

ADDITIONAL LITERATURE.—BREWSTER, WILLIAM, Bull. Mus. Comp. Zool., Harvard College, LXVI, 362-364, 1925.

GALLINACEOUS BIRDS: Order Galliformes

The Gallinaceous birds, of which the barnyard fowl is the familiar type, obtain much of their hard food by scratching it from the ground and so have short, stout, convex bills, stout legs, and blunt claws, the front toes commonly slightly webbed at base. The crop is large and as seeds and nuts form a great part of their food, the gizzard is very muscular—in all but the Sage Grouse whose food does not require it—lined with a tough, almost horny coating, peculiarly adapted to grinding. They are chiefly terrestrial and some of them typically polygamous.

REFERENCES.—DWIGHT, JONATHAN, Auk, XVII, 34-51; 143-166, 1900 (molt).—GRINNELL, G. B., American Game Bird Shooting, 1910.—JOB, H. K., Bull. 2, Nat. Assoc. Audubon Soc. (propagation).—JUDD, S. D., Biol. Surv., Bull. 21, U. S. Dept. Agr., 1905 (quail); Biol. Surv., Bull. 24, U. S. Dept. Agr., 1905 (grouse and wild turkeys).

GROUSE, PTARMIGANS, etc.: Family Tetraonidae

In the Grouse, while the head is feathered, the male generally has a strip of naked skin over the eye and sometimes also a patch of distensible skin on the sides of the neck, which adds volume to the mating notes; and in some species there are lengthened or otherwise modified neck feathers used in courtship display. As they are mainly residents of the cold-winter Boreal Zone, the legs and feet are more or less feathered, the feathering extending to the claws in the Arctic-Alpine Ptarmigan; and when the toes are naked they have horny fringelike processes, shed in midsummer, that enable the birds to hold themselves up as if with snowshoes on snow. The plumage of those of the family that live in shaded forests or on open plains is of subdued grays or browns, but the Ptarmigan, which live above timberline throughout the year, change from mixed rock colors to pure white for protection during the winter snows.

DUSKY GROUSE: *Dendragapus obscurus obscurus* (Say)

PLATE 17

DESCRIPTION.—*Male*: Length about 20-23 inches, wing 9.4-10, tail 8, weight about 2½ to 3½ pounds. *Female*: Length about 17.5-19 inches, wing about 8.7, tail 6. Legs feathered to toes. *Adult male*: Head with orange comb over eye and neck with inflatable air sacs, flesh color changing to purple red in the breeding season; upperparts dusky or bluish slate, "finely waved and vermiculated in zigzag" with gray and



FEMALES

CHIMNEY

stubs and fallen branches in smoke so thick that they were frequently lost to view. In the vicinity of every fire observed, Hawks were present, and as many as twenty individuals were noted at one time" (1917, p. 209).

ADDITIONAL LITERATURE.—BREWSTER, WILLIAM, Bull. Mus. Comp. Zool., Harvard College, LXVI, 362-364, 1925.

GALLINACEOUS BIRDS: Order Galliformes

The Gallinaceous birds, of which the barnyard fowl is the familiar type, obtain much of their hard food by scratching it from the ground and so have short, stout, convex bills, stout legs, and blunt claws, the front toes commonly slightly webbed at base. The crop is large and as seeds and nuts form a great part of their food, the gizzard is very muscular—in all but the Sage Grouse whose food does not require it—lined with a tough, almost horny coating, peculiarly adapted to grinding. They are chiefly terrestrial and some of them typically polygamous.

REFERENCES.—DWIGHT, JONATHAN, Auk, XVII, 34-51; 143-160, 1900 (molt). GRINNELL, G. B., American Game Bird Shooting, 1910.—JOB, H. K., Bull. 2, Nat. Assoc. Audubon Soc. (propagation).—JUDG, S. D., Biol. Surv., Bull. 21, U. S. Dept. Agr., 1905 (quail); Biol. Surv., Bull. 24, U. S. Dept. Agr., 1905 (grouse and wild turkeys).

GROUSE, PTARMIGANS, etc.: Family Tetraonidae

In the Grouse, while the head is feathered, the male generally has a strip of naked skin over the eye and sometimes also a patch of distensible skin on the sides of the neck, which adds volume to the mating notes; and in some species there are lengthened or otherwise modified neck feathers used in courtship display. As they are mainly residents of the cold-winter Boreal Zone, the legs and feet are more or less feathered, the feathering extending to the claws in the Arctic-Alpine Ptarmigan; and when the toes are naked they have horny fringelike processes, shed in midsummer, that enable the birds to hold themselves up with snowshoes on snow. The plumage of those of the family that live in shaded forests or on open plains is of subdued grays or browns, but the Ptarmigan, which live above timberline throughout the year, change from mixed rock colors to pure white for protection during the winter snows.

DUSKY GROUSE: *Dendragapus obscurus obscurus* (Say)

PLATE 17

DESCRIPTION.—*Male*: Length about 20-23 inches, wing 9.4-10, tail 8, weight about 2½ to 3½ pounds. *Female*: Length about 17.5-19 inches, wing about 8.7, tail 6. Legs feathered to toes. *Adult male*: Head with orange comb over eye and neck with inflatable air sacs, flesh color changing to purple red in the breeding season; upperparts dusky or bluish slate, "finely waved and vermiculated in zigzag" with gray and



DUSKY GROUSE

FEMALES

MALE IN BREEDING PLUMAGE

brown; tail blackish with terminal bluish gray band 1-1½ inches wide on middle feathers, .5-.8 wide on outermost; underparts light slaty, varied with white especially on lower belly and flanks; iris brown-orange, bill black, feathered feet grayish, barred with brownish. *Adult female*: Like male but smaller and lighter, upperparts more varied with white and tawny, some of scapulars with white shaft streaks. *Young in juvenal plumage*: Like adult female but "upperparts with hammer-headed white shaft lines. Tail with white shaft lines enlarged at end, also marked on some of the feathers with wavy blackish cross bars" (Coues).

RANGE.—Resident in Canadian and Transition Zones in Rocky Mountains from northern Utah and Colorado to western New Mexico, central Arizona, and eastern Humboldt Mountains, Nevada.

STATE RECORDS.—The most southern extension of the range of the Dusky Grouse is found in New Mexico, where it occurs south to the Mogollon Mountains. From the Mogollons it has been noted on most of the higher ranges northward; the San Francisco Range (B. B. & R.), and mountains near Aragon, Socorro County (Ligon); Eagle Peak in the Tularosa Range, and Pinyon Mountain, north of the Datil Range (Bailey); San Mateo and Zuni Mountains (Grover); Santa Clara Peak, Pelado Peak, the head of Coyote Creek in the Jemez Mountains, and the San Juan Mountains (Bailey); [on the divide between Black Lake and Moreno Valley (S. E. Piper, 1919)]. It is most abundant in the great mountain mass from Pecos Baldy north to the Colorado-New Mexico line and ranges continuously throughout its heavy coniferous forests.

It lives mainly on the mountain sides from about 7,500 feet or as low as squaking aspens grow, nearly to timberline (Ligon). An early set of eggs was taken May 16, 1898, at 10,000 feet on Hermit Peak, San Miguel County (Mitchell). The nesting season continues so long that young only a third grown were seen in early August, 1903, at 11,000 feet on Pecos Baldy (Bailey). The species sometimes nests as low as 8,000 feet, as at Willis, where it was common the middle of July, 1903 (Bailey). It always nests in the timber, but after the young are partly grown both old and young often range into the open, and in 1903, as late in the fall as October 7, were found near Wheeler Peak at 12,000 feet, a thousand feet above timberline (Surber). During the winter season it retires from these higher altitudes, but many still remain not much below timberline, while others descend into the lower valleys to 8,000 feet near Taos Pueblo (Bailey), and to 7,000 feet near Chama (Loring). [In 1916, Ligon reported them well scattered over the northern and western parts of the State, but apparently not abundant anywhere. In May, 1916, a heavy freeze and snowstorm prevented the raising of young in the Sangre de Cristo region, and in 1919 the birds were only just regaining their former numbers. In 1922 Jensen wrote from northern Santa Fe County that owing to a statewide close season of several years duration they had increased considerably in numbers and were quite common in the mountains from 9,500 feet to timberline. Sheep herders told him of nests containing 7 to 14 eggs. In 1927, Ligon stated that, west of the Rio Grande, the Grouse "occurs only very locally about the summits of the highest ridges and peaks of some of the mountains," and added that, "Formerly it was far more common throughout its range than at present." Over considerable stretches of its range it has remained very scarce, doubtless because of "unfavorable breeding conditions, particularly scarcity of natural ground cover. Where the natural growth of weeds and grasses has been permitted to develop, the birds have best retained their numbers" (Wild Life of New Mexico)].—W. W. COOKE.

NEST.—A shallow depression beside a log or under grass or bushes, slightly lined with a few pine needles or a little grass. *Eggs*: Most commonly 7 (Ligon), buff or cream color, spotted over the entire surface with brown.

Food.—In 45 crops and stomachs examined, the food consisted of 6.73 per cent animal matter—5.73 per cent grasshoppers, and the rest beetles, ants, and caterpillars—and 93.27 per cent vegetable matter—seeds, fruits, and leaves, coniferous foliage amounting to 54.02 per cent, fruits 20.09 per cent, including manzanita berries, mountain ash, service-berry, currant, gooseberry, etc. One cock shot



MAP 3. DUSKY GROUSE

Shaded areas show former and present range. Apparently none now remain in the Zuni Mountains or on top of Mount Taylor (Ligon, 1926)

at 11,600 feet on Pecos Baldy in a strawberry patch had both crop and gizzard filled mainly with strawberries. The crop of another shot between 8,000 and 9,000 feet contained 27 strawberries, 28 bear-berries, 12 Canadian buffalo-berries, flowers of Indian paint brush and milk vetch, leaves of vetch and buffalo-berry, and a few ants and caterpillars, while its gizzard was filled with seeds of bear-berry, Canadian buffalo-berry, and strawberry, a few green leaves, and a number of ants, beetles, and other insects. Grasshoppers, the green leaves of blue-berry and vetch, salal, and other berry seeds, needles of Douglas spruce and fir, together with gravel and

hard quartz grinding stones were among the items that the field examination of other specimens revealed. The quartz grinding stones were found in gizzards apparently filled with hard coniferous needles. These needles seem to be the regular winter food as under a winter roosting tree on Pecos Baldy the winter dung was composed entirely of spruce needles. [Three birds taken in September near Golden, Colorado, had their "crops crammed with the berries of kinnikinnick" (Lincoln)].

GENERAL HABITS.—In the depths of the coniferous forest you may suddenly discover a Dusky Grouse with its small pointed head and hen-like body sitting quietly on a log facing you, as if secure in its disguise—a dusky bird in the dusky woods surrounded by shadowy tree trunks. From a forest trail you may flush one that has been dusting itself in the soft earth, or hearing a muffled ventriloquial hooting may creep up within sight of the lordly cock at the foot of a conifer with purplish red neck pouches dilated. Again, in the open, you may be startled by a loud whir and look up to see great dark forms with a wide spread of wing disappearing over your head; or, on a steep mountain side, catch sight of a big Grouse sailing off below you with stiff outstretched wings and a spread tail whose gray band makes a striking mark to follow among the branches. If still more fortunate you may surprise a family in a mountain meadow, for strawberries are evidently one of their favorite summer foods.

The years that we were in the Sangre de Cristo Mountains, broods of young Dusky Grouse were surprisingly scarce. During a month spent on Pecos Baldy—July 16–August 15, 1903—eleven cocks, nine hens, and only six broods of young were seen, the broods varying in number from but one to six; one, two, three, and four being attributed to specific families. As the birds were protected and the ground cover was good in that section, it is possible that the severe hailstorms may have had something to do with their scarcity and the smallness of their families. Also, as Mr. Ligon notes, many young are doubtless killed by coyotes, skunks, and wildcats. In the overgrazed sections of the mountains, as he says, the absence of weeds, grass, and brush at breeding time increases immensely the dangers to which nesting birds and the young are exposed (1927, p. 121). When we crossed to the east slope of the Taos Mountains, on September 17, 1903, six adult Grouse were found in the woods at 11,000 feet; four, one hen and three nearly grown young at 11,500 feet; and a dozen cocks and hens at 12,000 feet, above timberline on an open slope where they were catching grasshoppers. The next year while we were high in the Taos Mountains, about two weeks in early August, 1904, our Indian, Sun-Elk, saw ten old Grouse but only one brood—of four or five less than half grown chickens—between 10,300 and 11,900 feet, a hundred feet below timberline. Of the ten birds seen there were three pairs, three cocks, and the one hen with the brood of chickens.

In the smaller mountain ranges visited we met with few Grouse. In the beautiful parks on the crest of the San Juan range in September, 1904, the only ones we saw were two great cocks that rose before us with a whirl and flew swiftly into the conifers. A month later two old cocks were taken at 10,000 feet in the Jemez Mountains, both in the midst of their molt, having partly new and partly old wing and tail feathers, but a body cover dense enough to protect them from the cold, which was important as snow had already fallen at 10,200 feet. Grouse "sign" was found in the Jemez Mountains about five hundred feet higher, also at the foot of a Douglas spruce near the top of Pinyon Mountain in October, 1906, where the apparent absence of the birds themselves seemed accounted for by the fact that two Golden Eagles were hunting carefully through that strip of fir.

Even the discovery that the big birds had lived along our trail brought enjoyment. But our pleasantest experience with Dusky Grouse in New Mexico was at 11,000 feet on Pecos Baldy, where an old hen and her brood after a short acquaintance trustingly accepted us as neighbors. We discovered them when climbing up on the grassy slope beside our camp, a sunny slope dotted with Mariposa lilies and bountifully supplied with patches of wild strawberry. As I have recorded it, "Half way up the hill two little Grouse about a third grown sprang from the long grass at Mr. Bailey's feet, one whizzing off in one direction and one in another. Quick as a flash the mother appeared from behind a rock close by and 'sputtered and fussed,' standing for some time within five feet of the enemy, effectually distracting his attention from her brood. Hoping that she would wait, he called me to bring the camera, but on my approach she started up the hill leading us to the woods, pointing the way with flags flying—head, crest, and tail up, an alert, conspicuous figure."

On reaching the cover of the woods I waited for the old bird to compose herself and on coming out "found her sitting quietly by a log on the edge of the woods. I wanted to get her into the light to photograph her and she let me drive her a few steps at a time until one of her brood hidden by the log flew up into a tree. Instantly the little hen, which had been demurely permitting me to shoo her around, was transformed into the alert, anxious mother, and hurried back into the woods evidently expecting me to follow. Instead, I sat down on the grass and kept quiet.

After some time I was rewarded by the faintest possible call from behind me, and looking keenly in its direction discovered her creeping cautiously out of the dark woods, crest and head down, tail hanging. Not seeing me she came out to the edge of the meadow, mounted a log, and giving a low cluck, such as a motherly hen gives when quieting her brood, she emitted two loud characteristic, wild, whistling notes, on the instant leaning forward, craning her neck to listen. From the grass

down the slope came a faint quavering answer from her little one—the one that had not been heard from since Mr. Bailey flushed it. At the answer the mother raised her head as if satisfied, and having placed it by her loud cry, called quietly at short intervals as if to draw it toward her.

While she was hunting up her second fledgling, the first one, the one that I had frightened into a tree, flew obliquely down into the grass several rods from the woods. At this the old bird cautiously made her way out to it, creeping through the high grass between the sods as she had come from the woods, crest down, tail hanging, pecking at the grass at each side as she went. The small Dusky, on the contrary, stood up as high as its few weeks would permit, its diminutive crest raised, eagerly watching its mother's approach. As I appeared on the scene at that point, the old bird drew back a little, but the youngster, quietly making a detour behind my back, joined her, and later when I succeeded in photographing the hen, at about seven feet, the chicken was almost in focus also.

Another day we came on the mother and one of her brood out on the open hillside, whereupon the old one promptly flew up into the nearest tree. The little one, badly frightened, crouched round-backed and flat-headed in the grass, its heart beats throbbing in its throat. After photographing it we got up within two or three feet of it, when it burst away on its small stiff wings, coming to ground again under its mother's tree. She clucked to it from her branch overhead and it squatted low, almost hidden in the protecting grass. We talked to it soothingly for some time and then drove it gently out into a better light, when quite reassured, before we had time to get a picture, it walked away, its little crest and tail raised in a very cocky manner.

During a cold stormy night a week later the old Grouse brought her brood into the firs behind our camp, and in the night, when a deer whistled, she was so startled she almost flew into our tent. The next morning her strawberry patch was white with hailstones and we found her sitting humped over a stone, while her two bedraggled young were trying to keep warm under cover of the firs. By this time our little neighbors were so tame that they were not disturbed by the close report of a gun, and, as Mr. Bailey said, if we had stayed much longer they would have been so tame that some one might have shot them when we left. But as we broke camp soon after, we hoped that we had made no such return for the pleasure given us by the little family while camped in their woods (1904b, pp. 87-89).

The Dusky Grouse is one of the most notable game birds of the region, but if overgrazing is allowed to continue and as more and more campers go to the mountains, it will become lamentably scarce unless wisely protected.

ADDITIONAL LITERATURE.—BROOKS, ALLAN, Auk, XLIII, 281-287, 1926 (display).—EDSON, J. M., Condor, XXVII, 226-229, 1925 (Sooty Grouse).—JUDD, S. D., Bull. 24, Biol. Surv., U. S. Dept. Agr. 41-44, 1905.

SOUTHERN WHITE-TAILED PTARMIGAN: *Lagopus leucurus altipétens* Osgood

DESCRIPTION.—*Wing*: 6.3-6.7 inches. Feet densely feathered, suggesting the name hare-feet. Male with a naked red comb over the eye (after the breeding season less brilliant and mostly covered with feathers). *Adults in winter*: Pure white; eyes, bill, and claws black. *Adults in summer*: Belly, wings, legs, and tail white, but tail hidden by long mottled coverts; rest of plumage variously spotted, barred, and mottled with black, white, and pale fulvous or buffy. *Adults in fall*: Upperparts pale cinnamon-rufous; back, rump, and upper tail coverts finely dotted and vermiculated with brownish black; head and neck lighter, breast, sides and flanks similar but darker; occasional feathers of breast marked with white; middle of abdomen, under tail-coverts, tail and wings pure white. *Young*: Till half grown, tail gray; afterwards white.



FIG. 32. Foot of Ptarmigan



Photograph by E. R. Warren

FIG. 33. The Ptarmigan in Winter Disguise

RANGE.—Resident in Arctic-Alpine Zone of Cascades and Rocky Mountains, in Washington, Montana, Wyoming, Colorado, and New Mexico.

STATE RECORDS.—The Southern White-tailed Ptarmigan was added to the known forms of New Mexico by Dr. B. J. D. Irwin, U. S. A., who secured specimens near Cantonment Burgwyn before 1866. They were probably obtained on the Truchas Peaks in the Sangre de Cristo Range, the nearest mountains to Cantonment Burgwyn high enough to furnish the necessary conditions. This was many years ago before the high country had been given over to sheep grazing, and at that

time the birds were undoubtedly common at this the most southern point in their range. They were reported as still present in 1903 on the Truchas Peaks, but were decidedly rare, for although Truchas was climbed that summer by three parties of the Biological Survey none were seen. On the next northern group of mountains in the Sangre de Cristo Range—the Taos Mountains—our Taos Indian, Sun-Elk, reported seeing four at Lake Fork in 1902; an old Taos Indian, Dark



Photograph by E. R. Warren

FIG. 34. Mother Ptarmigan Dressed to Protect Her Brood When the Snow is Gone

Gray Buffalo, reported seeing a few every year near the headwaters of Lucero Creek, about 4 miles south of Twining; a small flock was found on January 24, 1904, at 12,500 feet, far above timberline (Surber); and although the peaks were hunted over unsuccessfully four times, finally, on July 23, three were seen and one shot by Sun-Elk at about 13,000 feet; another was shot by him August 6, at about 13,400 feet, on the highest peak between Wheeler Peak and South Fork. Four others were reported killed on the highest peak of the Culebra Mountains—Costilla Peak—the latter part of August, and on August 20 at about 13,200 and 13,300 feet, piles of winter sign were seen—as much as two quarts in one place. A passing hunter said he had seen Ptarmigan there, usually in small flocks but sometimes as many as 50 together (Bailey). [In 1917 a flock was seen at Gold Hill north of Taos, and there were supposed to be several flocks on the peaks at the head of the Pecos (Leopold, 1919). In July, 1919, an especial effort was made to locate them on Pecos Baldy and the Truchas Peaks, but without success, and no recent records were reported; but in 1924, on June 19, a lone bird was seen near timberline on the east slope of Wheeler Peak, Colfax County, at about 12,500 feet, and it was reported that some were seen from time to time on Gold Hill, a few miles north of Wheeler Peak. In 1926, it was found that they had been practically exterminated in that

section but on November 29 two were discovered on one of the Costilla peaks, farther north (Ligon).]—W. W. COOKE.

NEST.—On ground frequently in the open, a depression in the grass or scantily made of grasses and a few feathers. Eggs: 8 to 15, dull creamy to pale reddish, generally lightly but sometimes more heavily marked with brown.



MAP 4. SOUTHERN WHITE-TAILED PTARMIGAN
Shaded areas show former and present range

FOOD.—In winter, largely willow buds and leaves; at other times, so far as known, beetles, grasshoppers and other insects, seeds, flowers (heather, blueberry, etc.), leaves, catkins, and the buds and leaves of dwarf birches, pines, and firs. The crop of one New Mexico specimen was filled mainly with leaves of the dwarf willow, and fruiting spikes of *Polygonum viviparum*, with one flower of *Geum rossii*, while the gizzard held mainly *Polygonum* seeds, a few other small seeds, a few small grasshoppers, and other small insects.

GENERAL HABITS.—The diversity of the New Mexico fauna is one of its most compelling features, a diversity found in only one other State in the union and rarely found by the traveler short of the Tropics, where glacier-crowned peaks look down upon groves of spreading palms. For within the boundaries of New Mexico the naturalist finds not only the birds of arid plains and coniferous forests, but rare Lower Sonoran stragglers from Mexico and heritages of the Arctic-Alpine summits of the northern Rocky Mountains. Among these the most remarkable is the furry-footed, White or Snow Grouse, named locally from its snow white winter plumage—which formerly found congenial nesting grounds on the highest peaks of the Sangre de Cristo Range in the Pecos and Carson National Forests. In the Taos Mountains a few were found in 1904, and the Taos Indians told us of their greater abundance in former years. Sun-Elk, our Indian camp man, spoke of seeing “a whole lot” about twenty years previously, and a ranchman told us of finding twenty together. But at the time of our visit sheep herders were running large bands of sheep over the tops of the mountains, and after scaring up the birds with their sheep might easily have killed them with stones. In any case white wing quills were found on the trail near where two of the tame unsuspicious birds were seen later. In the Culebra Mountains, where some men reported killing four Ptarmigan, the same day a band of probably two thousand sheep followed along the crest of the ridge, so that if the Grouse were not killed at the time, the vegetation on which they lived was destroyed.

A local hunter whom Mr. Bailey met on Costilla Peak said that he usually found the “Snowbirds,” as he called them, very tame and sitting around on the little benches near a snow-bank at about 13,300 feet. In the mornings, he said, the cocks could be heard making a noise like a hawk. While patches of snow are still on the ground, the Ptarmigan apparently do not need to go to water, as they eat the snow; but Mr. Warren says that after the snow has melted, they often go to water once a day. In the Taos Mountains, we were told by an old Indian buffalo hunter, “Dark-Gray Buffalo,” in May and June the Ptarmigan have their broods of yellow and white little ones, “like chickens,” at about timberline, but the last of July or first of August they go on up to the “highest of places.” Here they are found on the grassy slopes and the rocks, the brooding mother with a remarkable grass pattern, the cock with what Dr. Frank M. Chapman describes as a lichen-covered rock plumage made effective by rigid statuesque pose. This statuesque pose is even assumed by the young. In one instance, quoted by Taylor and Shaw, when an interested woman approached a mother of a brood too closely, she uttered her warning. “The chicks feeding close about her feet at once ‘froze’—one with his head down, after a bug; one with his body stretched up to reach something on a bit of heather. It

was very amusing. They stayed exactly as they were at her first note and held the pose for it seemed a minute until the mother gave a satisfied little cluck; then they went on with their feeding, none of them either before or after the alarm paying the slightest attention to me, seeming to depend utterly on the mother's watchfulness" (1927, p. 145).

Testimony as to the efficacy of their protective coloration is given by Mr. W. C. Bradbury and his party of would-be photographers who have had the birds vanish almost before their eyes (1915, pp. 216-218), and by remarkable photographs of almost invisible brooding birds on the nest. As the birds live wholly on mountain slopes exposed to hawks and eagles their lives depend on this "obliterative" coloration developed in conjunction with slow movements. In spring and fall, as Abbott Thayer states, "the birds pass through a long intermediate stage, when they are curiously and ever-varyingly pied with white and brown or gray . . . the extraordinary slowness of the two seasonal color-changes, "covering the periods of snow patched ground between the snows of winter and the bare ground of summer" (1909, chap. 7). On September 20, 1921, in northwestern Alaska when Mr. Alfred Bailey found just a faint trace of snow on the ground and the Ptarmigan which were changing to the white winter dress were very conspicuous on the brown tundra, they would "usually alight in patches of 'Alaska cotton,' a grass with cotton-like tufts which effectually concealed them" (1926, p. 121). This raises an interesting question—a bird's sense of its own protective coloration as a byproduct of natural selection. How necessary is it to make protective coloration protect, to save the life of the bird?

When studying the Alaska Willow Ptarmigan, Mr. Joseph Dixon had many interesting experiences. The cock, which seems to be an exception not only to other ptarmigans but to most cocks of the grouse family, we are told shows a strong attachment for the young, assisting in taking care of them and displaying as great solicitude for their safety as the female. A brooding female discovered when off the nest, "sneaked along, with body, head and tail all low to the ground. . . . The behavior of the male was entirely different. He strutted about with tail sticking out stiffly behind. The head was carried erect and his neck was extended. The vivid coral red comb over each eye was carried erect and was conspicuous to a distance of about fifty feet. He kept hiding by running behind trees, but when a little way off he would mount a tundra tussock or rock and give his coarse warning cackle." His combs, held erect in alarm, when he was at rest were relaxed and not nearly so noticeable.

When coming upon an old hen and her brood, Mr. Dixon says, "I rushed after the young, trying to catch one. Just as I was about to grab a chick, a willow bush in front of me exploded and the cock ptar-

migan flew directly into my face, knocking my glasses to one side as he slapped my face with his beating wings." When he was finally caught to be taken back to camp for a photograph, Mr. Dixon goes on, his devoted mate "came rushing at me and then crawled feebly about at my feet as though in mortal agony" (1927a, pp. 213-217). The thieving gulls and wandering red foxes and grizzly bears had apparently made the ptarmigan both suspicious and valiant.

Other forms of this most interesting grouse, living on the high mountain slopes seldom visited by man, have preserved the trustfulness that gives the peculiar charm to birds in uninhabited regions. And in cases where the trust has not been betrayed, not only have the birds proved ready subjects for the enthusiast in bird photography, but the brooding mother has actually allowed herself to be lifted from the nest for a close inspection of her eggs.

As the little Snow Grouse is at once one of the most delightful and notable members of New Mexico's richly varied fauna, every effort should be made to guard the few peaks where it is making a last stand and save its remnant from wanton extermination. Excessive grazing by both sheep and cattle on the peaks above timberline, destroying the protecting ground cover as well as the food, has been largely responsible for the disappearance of this rare arctic bird but it has been accelerated by both lawless hunters and predatory animals. In its Montana home in Glacier National Park, the protected Ptarmigan ranks with the mountain sheep and goats as an object of keen interest to nature lovers. Shall New Mexico lose this rare asset?

ADDITIONAL LITERATURE.—BAILEY, VERNON and F. M., Wild Animals of Glacier National Park, Nat. Park Service, U. S. Dept. Interior, 139-144, 1918.—BENDIRE, C. E., Life Histories of North American Birds, I, 83-88, 1892.—CHAPMAN, F. M., Camps and Cruises of an Ornithologist, 357-366, 1908.—CONOVER, H. B., Auk, XLIII, 316-317, 1926.—COUES, ELLIOTT, Birds of the Northwest, 425-429, 1874.—GRINNELL, JOSEPH, Educational Leaflet 60, Nat. Assoc. Audubon Soc.—HILL, G. A., Condor, XXIV, 105-108, 1922.—SETON-THOMPSON, E., Bird-Lore, III, 186, 1901.—TAYLOR, W. P., and W. T. SHAW, Mammals and Birds of Mt. Rainier Nat. Park, pp. 140-146, 1927.

LESSER PRAIRIE CHICKEN: *Tympanuchus pallidicinctus* (Ridgway)

DESCRIPTION.—*Male*: Wing 8.2-8.3 inches, tail 4-4.2. *Female*: Wing 8-8.2 inches, tail 3.5-4. Legs scantily feathered to toes, in front and on sides; *sides of neck with erectile tufts* of elongated feathers, 2.5 inches or more in length. *Adult male*: Head with a slight soft crest, neck with inflatable air-sacs, yellow in breeding season; upperparts pale brownish, *back barred in sets of threes*, a wide brown bar enclosed by two narrow dusky bars, underparts, similarly barred. *Adult female*: Similar but neck tufts rudimentary. *Young*: Upperparts yellowish-brown, feathers with conspicuous white shaft streaks and large black blotches; underparts yellowish-white, with grayish brown bars.

RANGE.—Upper Sonoran Zone of Great Plains, from Kansas south to central Texas and eastern New Mexico.

STATE RECORDS.—A single line printed more than 60 years ago in one of the Pacific Railroad Reports was until recent years the sole authority for the inclusion of the Prairie Chicken in the list of New Mexico birds. In January, 1854, Capt. John Pope began his exploration of the route along the thirty-second parallel between the Rio Grande and the Red River of Texas. By the middle of March the party had reached the mouth of Delaware Creek, just where the Pecos crosses from New Mexico into Texas. From this camp, Capt. Chas. L. Taplin was sent to explore the country to the northeast. On March 11, 1854, Captain Taplin's report says that Prairie Hens were quite numerous. The party was then just inside New Mexico and 15-20 miles north of the extreme southeastern corner of the State. Six days later when about 10 miles over the Texas line he reported "Game wild; nothing killed but one Prairie-Chicken." Two specimens killed during Captain Pope's trip were made the types of the species *pallidicinctus*, but as they were labeled nothing but "Near 32° L." it is impossible to say on just what part of the route they were obtained. It is probable that they were collected not far from the Clear Fork of the Brazos River near the site of the present town of Abilene, at which place large additions were made to the natural history collections.

The two records quoted above—March 11 and March 17—were made in the most arid part of the Staked Plains, at least 50 miles from water in all directions. As these parts of New Mexico and Texas are not yet thickly settled it may be that a few prairie chickens still exist there, but over much of the country a little distance to the eastward which is supplied with water and has been long settled, they have entirely disappeared. In the 1910-11 report of the State Game and Fish Warden, Mr. Thomas P. Gable, they were said to have been found in Guadalupe and Curry Counties; and Capt. M. S. Murray states that at one time they were "very plentiful about twenty-seven miles east of Kenna . . . so numerous that Homesteaders were anxious to get rid of them on account of destroying the crop." [In 1918 Mr. Ligon stated that they were rather common east of the Pecos River, but that "the inhabited range of the bird has receded from the northwest of Portales, on account of the coming of rather extensive villages and settlements, where hunting was done." Farther south, since they have been protected, it is said that they have pushed considerably west—east and southeast of Roswell; but it seems probable that from lack of suitable territory this western movement can not extend beyond the fertile sandhills east of the Pecos River.

In January, 1919, Ligon investigated the extreme southeastern part of the State, which used to be a great winter range, but failed to find any birds or get any evidence of their presence later than the previous winter. But on May 18, 1925, he saw about 25 on a limited area of sand-shinnery country, 40-50 miles south and southwest of Portales. One specimen was secured. He was informed that the Portales birds migrate well down toward the Texas line, east of Carlsbad in the winter. Hunter J. T. Bowman told him that he saw several in the sand country east of Dexter the winter before and that they had been found there in previous winters. Albert Mitchell of Albert, assured him that there are some in the sand country east of Albert. Sportsmen of Nara Visa say some come into that section in winter, probably from southeastern Colorado. "A few remain southwest of Clayton and occasional stragglers are observed in other sections of their former range. During the last few years there has been some increase and evidence of reoccupation of range" (Ligon, 1927).]—W. W. COOKE.

NEST.—A slight excavation in the open or among grass or weeds, sparingly or thickly lined, according to abundance of material at hand, with grasses and a few feathers. Eggs: Usually 11 to 14, grayish olive, or buffy, plain, or spotted with fine pin points of reddish brown.

GENERAL HABITS.—The Prairie Chicken like the Sage Grouse is a peculiarly interesting bird which might be reestablished in New Mexico. "It formerly inhabited all of the sandhill type of country in eastern New Mexico," and if its range lands are not abused by overgrazing, with proper protection not only on its safer breeding grounds but in more exposed situations when wandering in fall and winter, it should reestablish itself over its former range (Ligon, 1927). It is also easily domesticated and could probably be successfully introduced about ranches on the Staked Plains where it might be of material value as a game bird. Its famous courtship dances and loud booming calls make it a most interesting addition to any neighborhood.

ADDITIONAL LITERATURE.—CHAPMAN, F. M., *Camps and Cruises of an Ornithologist*, 229-235 (dances).—PIERCE, F. J., *Wilson Bulletin*, XXXIV, 100-106, 1922.

COLUMBIAN SHARP-TAILED GROUSE: *Pedioecetes phasianellus columbianus* (Ord)

DESCRIPTION.—Length 15-19 inches; wing 8.5-9; tail 4-5.5. *Adults:* Head with a soft pointed crest, brownish black with buffy feather edgings; a yellow naked comb over eye; neck deep buff, throat nearly immaculate; *upperparts buffy grayish or grayish clay color with interrupted transverse black bars*; pointed tail marked with brownish black and buffy white; shoulders with longitudinal spots of white; quills



Courtesy of *The Auk*; photograph by E. S. Cameron

FIG. 35. Prairie Sharp-tailed Grouse (*Pedioecetes phasianellus campestris*)
In winter the feet and legs become "rabbit-like," and the horny fringes of the toes serve well as snowshoes

marked with large white spots or bars; underparts white, breast and sides with brown V-shaped markings; iris light brown, bill olive above, gray below, feathered legs and feet grayish brown, toes with horny fringes. *Young in juvenal plumage:* Upperparts largely yellowish brown, feathers with irregular black patches and white shaft streaks; wings spotted with white; feathers of breast, sides and flanks pale yellowish brown with small black spots and white shaft streaks.

COMPARISONS.—The sharply pointed tail of the Grouse easily distinguishes it from the broad-tailed Prairie Chicken, which also has conspicuous neck tufts, lacking in the Grouse. (See p. 207.)

RANGE.—Mainly Transition Zone from interior of British Columbia and central Alberta south to northern New Mexico, Utah, and (formerly) northeastern California.

STATE RECORDS.—In 1926 Ligon found the Columbian Sharp-tailed Grouse common on Johnson Mesa, east of Raton, from 8,000 to 9,000 feet. On November 23 and 24, he saw three flocks, aggregating in number about 75 individuals, and collected a pair. The birds also occur, he found, in smaller numbers, on Barillo and Fisher Peak Mesas, northeast of Raton, Fisher Peak Mesa lying, for the most part, in Colorado, and so naturally leading them down into New Mexico.

NEST.—A hollow in the ground, usually hidden by a tuft of grass, lined with dried grass and a few of the bird's feathers. *Eggs:* 11 to 14, creamy buff to olive-brown, usually lightly spotted with reddish brown.

GENERAL HABITS.—Though naturally a bird of more northern country with abundant rank grass for breeding places, the high altitude of the grassy, broken rimmed mesas northeast of Raton, some 8,000–9,000 feet in elevation, "appears to create a little world suitable to it in New Mexico," which, the oldest settlers attest, has long been inhabited by it (Ligon, 1927). The fact that during the deep snows of winter it finds a ready supply of waste grain on the extensive grain lands of Johnson Mesa, suggests that a reduction in grazing in summer and feeding by ranchmen in winter might help to hold it in favorable territory. Better control of predatory animals will also help materially.

On the prairies of North Dakota where the true Prairie Hen and the Sharp-tailed Grouse occur together, when a startled grouse hidden by its cover whirrs up from under your feet to fly with a beat and a soar—several beats and a soar—and a low guttural *chuck-uk-uk-uk-ak*, the projecting tail feathers of the disappearing bird pronounce its name. Might they not deter the broods from following after strange mothers? "So it seemed when a parent of each species flew up beside our road, one of them trailing a large family of young" (1915–16, p. 175).

The small yellowish brown chicks, some with a wisp of crest, suggest young turkeys, and it is interesting to watch their wise mother trying to outwit the innocent looker-on by curving off on her broad wings, leaving them to hide away in the grass.

Though the Grouse usually keep well hidden in summer, as Mr. Bailey says—"in winter when their plumage has become dense and their feet and legs rabbit-like, they may be seen crossing the fields on top of the snow or getting their breakfast of buds from the tops of trees and

tall bushes. When the weather is cold and the snow deep and soft they often roost under the snow like the ruffed grouse, and come out in the morning fifteen or twenty feet from where they entered the white surface at night. In spring the males have a loud cackling note, besides a scraping sound produced apparently by opening and closing their rigid tail feathers" (1902, p. 132).

Like the Prairie Hen the Sharp-tailed Grouse has an interesting nuptial dance.

SAGE GROUSE: *Centrocercus urophasianus* (Bonaparte)

DESCRIPTION.—*Male*: Length about 26-30 inches, wing 12-13, tail 11-13. Weight $4\frac{1}{2}$ to 8 pounds. *Female*: Length 21.5-23 inches, wing about 10.5-11, tail 8-9. Legs feathered to toes; tail long, graduated, and spiked. *Adult male in breeding plumage*: Upperparts mottled grayish, shoulders with black wiry plumes and white downy feathers; neck with distensible yellow air-sacs surmounted by erect feathers; chest band blackish with black wiry feathers depending from it (worn off by rubbing on the ground during the breeding season); bill black and toes blackish. *Adult female*: Like male but smaller and without ruffs, air-sacs, or nuptial plumes; upperparts grayish, throat white, chest speckled, belly brownish black. *Young*: Like adult female but brown and buffy prevailing on upperparts and breast, black belly feathers largely tipped with white, tail beginning to show its especial form.

RANGE.—Sagebrush plains of Transition Zone from southern British Columbia, southern Saskatchewan, and western North Dakota south to northwestern Nebraska, north-central New Mexico, and eastern California.

STATE RECORDS.—In the sagebrush tract northeast of Tres Piedras, especially on the sage ridges 6 or 7 miles northeast, Ligon has been informed by a hunter, William Lilly, that Sage Grouse were formerly common, many of them having been killed by his family. They were rather common as late as 1908 near Tres Piedras. As great numbers of sheep are wintered in the region, Ligon thinks that sheep herders and wood haulers are probably responsible for their extermination. The only specimen on record proving the occurrence of the Sage Hen in New Mexico is that of a single one taken in September, 1874, by C. E. Aiken near Tierra Amarilla. This was undoubtedly one of an isolated colony as it is the most southern record for the species, which does not occur to the east nor in the San Luis Valley to the north, while more than 100 miles separates Tierra Amarillo from the district in southwestern Colorado near Cortez where it occurs regularly.—W. W. COOKE.

NEST.—A hollow scratched in the ground, generally under sagebrush. *Eggs*: Usually 7 to 9, rarely up to 17, grayish or greenish drab, lightly or thickly dotted and spotted with reddish brown.

FOOD.—Mainly sagebrush leaves, flowers and buds, but also soft parts of other plants, and in spring and summer grasshoppers, ants, and other insects. Many examined contained only grasshoppers and sagebrush leaves. The young are more insectivorous.

GENERAL HABITS.—The Sage Hen as it is familiarly known, is the largest of the grouse and one of the most notable of them all. It has the most highly developed sexual characters—a combination of air-sacs, plumes, and ruffs that are displayed in courtship performances as unique if not so spectacular as those of the Prairie Hen. These courtship per-

formances have been described by Mr. Frank Bond, who witnessed them in Wyoming. He writes: "During the months of April and May the sage cocks are usually found in small flocks of a half dozen or more, stalking about with tails erect and spread after the manner of the strutting turkey cock. . . . Instead of dragging its wings upon the ground the Sage Cock will enormously inflate the air-sacs of the neck until the whole neck and breast is balloon-like in appearance, then stooping forward almost the entire weight of the body is thrown upon the distended portion and the bird slides along on the bare ground or short grass for some distance, the performance being concluded by the expulsion of the air from the sacs, with a variety of chuckling, cackling, or rumbling sounds. This performance is continued probably daily during the pairing and nesting season, and of course the feathers are worn away by the constant friction" (1900, pp. 325-326).

While so large, the Sage Hen is so nicely colored that Mr. G. A. Abbott has found it in the sagebrush "squatting under a bush in typical Woodcock fashion, trusting to its protective coloration to escape detection" (1906, p. 152).

The extermination of the Sage Grouse in New Mexico is most unfortunate and it should be reinstated and given absolute protection until it becomes well reestablished. In States to the north and northwest of New Mexico where the Grouse was formerly abundant over immense sagebrush tracts, Mr. Ligon says, "its numbers were so reduced by unrestrained shooting that strict law enforcement and refuges were necessary to prevent total extermination." In New Mexico there is abundant opportunity for the restoration of this preeminent bird, for, as Mr. Ligon points out, "there are hundreds of thousands of acres of sage lands extending over San Juan, Rio Arriba, and western Taos Counties suited to no game bird so much as Sage Grouse" (1927, p. 119).

ADDITIONAL LITERATURE.—BURNETT, L. E., *Auk*, VII, 102-105, 1905.—GRINNELL, G. B., *American Game Bird Shooting*, 272-281.—HORSFALL, R. B., *Zool. Soc. Bull.*, N. Y. Zool. Soc., XXIII, No. 1, 3-6, January, 1920.—THAYER, G. H., *Concealing-Coloration in the Animal Kingdom*, Fig. 43, 1909.

QUAILS, etc.: Family *Perdidae*

BOB-WHITES AND QUAILS: Subfamily *Odontophorinae*

In the Quails the head is completely feathered and usually crested, the crest frequently assuming a remarkable shape; the toes are naked, with little or no fringe. Though terrestrial, the Quails take to trees at times, but nest on the ground; are chiefly granivorous, although they also feed on buds, fruits, and insects; and are non-migratory and monogamous, "the male and female remaining together during the season of incubation and hatching" (Grinnell).

TEXAS BOB-WHITE: *Colinus virginianus texanus* (Lawrence)

DESCRIPTION.—*Wing:* 4.2-4.6 inches, tail 2.2-2.7, bill .5-.6 depth of bill at base .3-.4, tarsus 1.1-1.3, middle toe .9-1.1. *Adult male:* Eye streak and throat white, with black collar; short crest and upperparts brown with whitish barrings and blackish blotches; chest with broad pinkish band; rest of underparts thickly barred with brown; iris brown, bill dark brown or black, feet grayish. *Adult female:* Like male but without striking black and white markings. *Young:* Back brown, streaked with white and spotted with black; breast brownish, streaked with white; belly white. Young male with buffy throat and eye streak like female.



FIG. 36. Texas Bob-white

RANGE.—Resident in Upper and Lower Sonoran Zones in the extreme eastern part of New Mexico and (formerly) through Texas to eastern Nuevo Leon and central Tamaulipas.

STATE RECORDS.—On August 6, 1820, during Long's Expedition from Pittsburgh to the Rocky Mountains, the Bob-white was seen, apparently near where the Mora River enters the Canadian (in James, 1823, vol. 2, p. 97). In the fall of 1845, Lieut.—later Gen.—J. W. Abert traveled from Bent's Fort on the Arkansas in Colorado, to Raton, and thence down the Canadian River to Texas. On September 1, when about 35 miles west of the Texas line he found several quail that were calling "bob-white" and he says these were the first he had seen since he left Bent's Fort. He found them continuously thence eastward, and the limit of their range westward seemed to coincide with the limit of the plum thickets which constituted a most excellent shelter. Bob-whites have not been reported from this part of New Mexico since Abert's time, but as they have been common only a little farther east at Tascosa, Texas, some may still remain on the New Mexico side of the line.

In August, 1903, both old and young were seen at Texline (Howell) on the New Mexico-Texas boundary; and they are common in Baca County, Colorado, close to the New Mexico line (Warren); and a few still remain in the northeastern corner of New Mexico. In former years they were most numerous in the Canadian River Valley, near Logan, and in the extreme southeastern corner of the State in the sandhill country up to about 4,000 feet (Ligon, 1927).]

They were most common in the sandy country 15-20 miles east of the Pecos, and after working westward in the years just previous, in 1907 reached the Pecos, several covies being known at Lakewood a few miles west of the river. A heavy and long continued snowstorm in the winter of 1906-7, however, apparently destroyed these birds. But on the Carlsbad Bird Reserve in January, 1915, they were reported occasionally by hunters (Willett). [In January, 1919, at Round and Red Lakes, 20 to 24 miles east of Carlsbad, and at the foot of the plains 50 miles northeast of Carlsbad where, two or three years previous, they were reported rather common, none were found, their absence probably being explained by dry weather, overstocked range, and lack of protection. In August, 1919, no trace of them was found in the State. Several years later—on a trip from May 27 to June 22, 1924—none were seen and no definite information was obtained regarding them. Some were said to be in the short canyons that cut into the plains southeast of Tucumcari, but the report could not be verified. Sportsmen at Nara Visa said that there were none in the Canadian River Valley on the New Mexico side of the line, but that there were some in the Texas Panhandle. No information could be obtained relative to them in Eddy or Union Counties, where it was hoped they might occur; but in

April, 1926, a few were reported on the lower Dry Cimmaron in Union County and three birds were heard of in the sandhills east of Portales (Ligon, 1927).]

As no specimens are available from this part of New Mexico, the subspecies to which they should be referred is uncertain. The nearest form in Texas is the subspecies *texanus*, and it is probable that the Pecos Valley birds are of this form.—W. W. COOKE.

Attempts to introduce the Bob-whites have met with little or no success, although they have been protected throughout the year since 1905. One of the first recorded introductions was in 1911, by the State Game Warden. Later, William H. Bartlett released about five hundred on his Vermejo Park Ranch, but he writes, "They did not stand the altitude, and drifted south and east and as far as I know have been killed" (MS). Some, brought from Oklahoma, were introduced in the vicinity of Roswell and a few may have survived (Ligon, 1927). Many have been brought in during recent years and with the opening of the season in 1928, shipments have been renewed from Coahuila, Mexico.

NEST.—On the ground, canopied or protected by weeds or bushes, lined with dry grass or weeds. Eggs: 10 to 18, dull white.

FOOD.—The Bob-white is of special agricultural value because it destroys a large amount of weed seed and a considerable number of insects. Half of its food is weed seed, only a fourth grain—mainly from the stubble fields—and about a tenth wild fruits. Fifteen per cent is composed of insects, including several of the most serious pests of agriculture. It feeds freely upon Colorado potato beetles and chinch bugs, and eats also grasshoppers, cucumber beetles, wireworms, billbugs, clover-leaf weevils, the Mexican cotton boll weevils, army worms, cotton worms, cutworms, and Rocky Mountain locusts.

GENERAL HABITS.—The Bob-whites, as Mr. Ligon explains, can not live on such bare ground as can the desert dwelling quail. "They must have the cover afforded by brush, weeds, and rank grasses" not only in summer but throughout the year. They prefer valley brush lands but these are most exposed to grazing abuse (1927, p. 142).

The habit of "feeding directly upon field crops," Doctor Judd pointed out, makes the Bob-white of peculiar economic importance. In the west, he says, "its favorite feeding ground is corn fields, and it often spends the night there instead of flying to cover as do most birds . . . the facility with which it passes from field to field, either on foot or on the wing, distributes its services to an unusual degree" (1905, p. 15).

But, quite aside from its economic importance, this attractive bird coming in from the Texas borders, with its loud cheerful calls and its ready friendliness would be a great addition to the delightful group of quail whose presence enriches New Mexico. Its return in normal seasons to the localities it has already reached together with its extension over the sandhill country of eastern New Mexico up to possibly 5,500 feet, should be intelligently encouraged by protection from wandering cats, dogs, and gunners, by artificial feeding in abnormal years, and, most important of all, by provision of adequate cover on waste lands in reclaimed valleys. For the disappearance of this Quail in the State is

wholly due to the destruction of ground cover—weeds and grasses (Ligon, 1927).

ADDITIONAL LITERATURE.—FORBUSH, E. H., Educational Leaflet 47, Nat. Assoc. Audubon Soc.

ARIZONA SCALED QUAIL: *Callipepla squamata pallida* Brewster

PLATE 18

DESCRIPTION.—*Length*: About 9.5–12 inches, wing 4.5–5, tail about 4.1–4.5, tarsus about 1.3. *Adults*: Pale bluish gray and dull brownish, *short crest tipped with white*; *foreparts of body appearing scaled*; belly with buffy patch, sides streaked with white. *Young*: Crest brownish, feathers with white shaft streaks; upperparts marked with rufous, black, and white; underparts washed with rufous, and more or less barred with blackish brown. *Young* of the year indistinguishable from adults.

RANGE.—Upper and Lower Sonoran Zones from southern Colorado, Kansas (three specimens), and Panhandle of Texas south to Arizona and Valley of Mexico.

STATE RECORDS.—“The Scaled Quail is distributed practically all over the State in treeless areas up to 6,500 feet elevation and even higher in the south” (Ligon, 1927, p. 134); it is most abundant in the eastern one-third and in the southern part of the State. Its abundant range includes the river valleys below 5,000 feet, mainly in Lower Sonoran Zone. It ranges up the valley of the Gila to Cliff and Cactus Flat, and up the San Francisco to Alma. Thence it ranges east to Silver, but is absent from the whole Mogollon Range. The valley of the Rio Grande serves as a highway for a long northward extension and from this main valley it passes up the Rio Puerco and up the San Jose and is more or less distributed in the San Juan Valley in northwestern New Mexico. A few extend up the Rio Grande to Taos and into the San Luis Valley, Colorado; also up the Chama to Abiquiu or beyond. A long arm of the range follows the valley of the Pecos from the Texas line north to Ribera, and a similar extension from Texas up the Canadian River carries the range to Rayado Creek and Chico Springs (Thurber, 1890, pp. 89–90). This is almost the extreme northern limit of the range of the species since only a comparatively few individuals are found in southeastern Colorado and northwestern Kansas.

In fall and winter in Union County, at Clapham, October 25, 1893, and at Perico, January 3, 1894, two flocks of 20 each were seen; and at Brooks Ranch, 4 miles north of Clapham, October 30, 1893, many were seen (Seton); November 5, 1915, they were very abundant (Ligon). In the vicinity of the Carlsbad Bird Reserve January, 1915, they were plentiful from the low country to at least 6,500 feet in the Guadalupe Mountains around ranches; noted during the winter of 1915–16 [noted in December, 1916; also, on the Rio Grande Bird Reserve (Elephant Butte), they were abundant November 23–December 9, 1916 (Willett)].—W. W. COOKE.

Seasonal fluctuations in distribution and abundance are especially striking in these quails. In October, 1918, they covered nearly the entire State except the mountainous parts from Raton to the Arizona line, and from the Colorado line to Silver City, only about 50 miles from the Mexican line. While abundant over the southern and eastern parts of the State and extending up the Rio Grande to Taos and the mouth of the Rio Hondo, northwest of Taos, up the Rio Puerco to Cuba, and northwest as far as Haynes, they were absent from the western border of the State. But a year later, in August, 1919, within their breeding range, owing to three years' drought and resulting exposure to enemies in a weakened condition, they had almost disappeared from western Texas, New Mexico, and eastern Arizona. In the once well-stocked San Andres, Oscura, and Manzano Mountains, and also in the Pecos

Valley north of Roswell, one was fortunate to see a bird; those remaining being seen mainly in Chaves, Eddy, and Lea Counties, where there was food and ground cover to protect them from their enemies. The return of a favorable season in 1919 came just in time to save the remnant, but in 1920, on a trip of 275 miles, from Silver City to the Mexican boundary, only nine pairs were seen and a few others heard (Ligon, MS). In 1922, they were common in northern Santa Fe County, nesting on the pinyon flats (Jensen). In 1924, from May 27 to June 22, they were found rather common throughout the Pecos Valley country and in the northeastern section of the State as far west as Cimarron; but in most localities, in 1923, 1924, and 1925—"culminating years of range devastation and drought . . . they came near the extermination point throughout the State," disappearing entirely from some of their highest and most northerly range. At the beginning of another cycle, in 1926, with favorable range and breeding conditions they reestablished their numbers so quickly that sportsmen were amazed. But in some sections where formerly most abundant,



MAP 5. ARIZONA SCALED QUAIL
Shaded areas show breeding and resident range



From Handbook of Birds of the Western United States

THE WELL-NAMED SCALED QUAIL, BLUE QUAIL, COTTON TOP

as in the foothills of the Guadalupe Mountains, more favorable seasons and light hunting will be required to restore them to normal numbers (Ligon, 1927, p. 134).

NEST.—On the ground, often under a yucca or low bush, and sometimes in a grain field or meadow, generally lined with a few coarse grasses. *Eggs*: Average, 12 to 14, thick shelled, without luster, cream white to pale buff, usually rather evenly dotted with buffy to reddish brown.

FOOD.—The Scaled Quail apparently eats more insect food than any of the other quails, or more than 29 per cent as against 70 per cent of vegetable matter. Of this vegetable matter over 50 per cent is weed seeds, among which are thistle, pigweed, and bindweed, a troublesome weed that often throttles other plants. *Dasyllirion* seeds almost entirely filled six stomachs examined. Wild fruit, such as prickly pear and the succulent parts of desert plants together with its larger per cent of insect food doubtless help it to live with a minimum amount of water. Its insect food includes grasshoppers, ants, and beetles—among them leaf chafers and cucumber beetles—weevils, such as the clover pest and scale insects (several hundred in one stomach) that feed on the roots of plants.

GENERAL HABITS.—The natural food of the Scaled or Blue Quail and its tameness about houses show how important it will become to the agriculturalist in the development of the country if properly protected and encouraged to take an active part in keeping down weed and insect pests on cultivated land. A family seen by us at the Bolles Ranch near Carlsbad loitering around the ranch house and perching on the brush woodpile like domestic fowl suggested what protected water and safe, congenial roosting places may do to tempt the friendly bird to come in from the desert. Where there is little ground cover, as in the Pecos Valley between Roswell and Fort Sumner, Mr. Ligon says the Quails collect about the ranches and huts where settlers have located, and in a corral on the McKenzie Ranch he saw pairs of them picking up grain left from feeding the horses. Ten such Quails, from a covey that were reared on a ranch east of Roswell and were so tame that they fed with the chickens, were killed in a blizzard that swept over the country in January, 1918, and apparently many others shared their fate as Mr. Ligon found very few in the valley the following summer.

As the name, *Callipepla squamata pallida* suggests, this quail whose life is spent in the strong sunlight of the arid cactus, mesquite, and greasewood valleys and pinyon and juniper foothills, is the palest of its family, its bluish gray tones presenting a striking contrast to the dark tones of grouse and quail living in humid, forested regions. So well do its pale colors and scale-like markings conceal it as it scuds through the mazes of the desert brush that the white tip of its crest, which gives it the local name of White-top or Cotton-top, is often all that catches one's eye.

That the downy young are also obliteratively colored is well illustrated by an experience of Major Goldman when climbing the Florida Mountains. At 5,300 feet, among the oaks and junipers, he reports, "I came suddenly on an adult bird and a brood of recently hatched

young. The old bird disappeared after giving several sharp cries of alarm, and the young also disappeared in an open patch of short grass. On reaching the place I began looking about carefully and soon saw one young bird flattened down, with not only its little body but its head and neck also pressed close against the ground, its downy plumage blending in well with the color of the ground and the dead grass stems." There it lay, pressed close to the ground until approached within three feet when, "it suddenly started up with sharp peeping cries, and the entire brood which had scattered and hidden in an area about fifteen feet across, half ran, half flew into some thick bushes where they were more securely hidden" (MS).

Although protective coloration and attitudes partly serve their purposes, protective cover is still vitally important, for as Mr. Ligon has found, "Prairie Falcons, Cooper Hawks, Roadrunners, snakes, skunks, wildcats, and coyotes all take their toll of these birds or their eggs"; in the northern part of their range, Magpies destroy both eggs and young; and over much of their range, hail, cold rains, and winter storms deplete their numbers.

The entire life of the Scaled Quail is spent in the environment to which it is so well adapted, but in the fall it is sometimes found a few hundred feet higher than in the nesting season. The duration of the nesting season is very irregular, but in favorable years two or possibly three broods may be raised. In seasons of long drought no young are seen, but with the first rains there is great excitement, the pairs busily calling and nest making. In southern New Mexico the first eggs have been reported early in May, but on the other hand, downy young were found by Mr. Bailey, in Santa Clara Canyon, on August 31, 1906; and on September 22, 1924, an Indian boy showed Mr. Jensen a nest on the U. S. Indian School field under a sage bush which contained ten eggs on the verge of hatching. As it was at an altitude of 7,000 feet and several days before the nest was found ice had formed a quarter of an inch thick on quiet pools, some fortuitous circumstance must have led to the phenomenally late nesting. When the young are raised these delightful little Cotton-tops go about in small flocks visiting water holes and river bottoms. Picking up insects, seeds, and berries as they go, they wander through brushy arroyas, over juniper-clad foothills, cactus flats, and sagebrush or mesquite plains calling to each other with a nasal *pay-cos*, *pay-cos*, which by long association comes to take on the charm attaching both to the gentle-eyed birds themselves and to the fascinating arid land in which they make their homes.

GAMBEL QUAIL: *Lophortyx gambeli gambeli* Gambel

PLATE 19

DESCRIPTION.—*Length:* About 9.5–10 inches, wing 4.4–4.7, tail 4.1–4.7, tarsus 1.2. *Adult male:* Head with long black decurved plume (about 1.5 inches);



GAMBEL QUAIL

FEMALE

young. The old bird disappeared after giving several sharp cries of alarm, and the young also disappeared in an open patch of short grass. On reaching the place I began looking about carefully and soon saw one young bird flattened down, with not only its little body but its head and neck also pressed close against the ground, its downy plumage blending in well with the color of the ground and the dead grass stems." There it lay, pressed close to the ground until approached within three feet when, "it suddenly started up with sharp peeping cries, and the entire brood which had scattered and hidden in an area about fifteen feet across, half ran, half flew into some thick bushes where they were more securely hidden" (MS).

Although protective coloration and attitudes partly serve their purposes, protective cover is still vitally important, for as Mr. Ligon has found, "Prairie Falcons, Cooper Hawks, Roadrunners, snakes, skunks, wildcats, and coyotes all take their toll of these birds or their eggs"; in the northern part of their range, Magpies destroy both eggs and young; and over much of their range, hail, cold rains, and winter storms deplete their numbers.

The entire life of the Scaled Quail is spent in the environment to which it is so well adapted, but in the fall it is sometimes found a few hundred feet higher than in the nesting season. The duration of the nesting season is very irregular, but in favorable years two or possibly three broods may be raised. In seasons of long drought no young are seen, but with the first rains there is great excitement, the pairs busily calling and nest making. In southern New Mexico the first eggs have been reported early in May, but on the other hand, downy young were found by Mr. Bailey, in Santa Clara Canyon, on August 31, 1906; and on September 22, 1924, an Indian boy showed Mr. Jensen a nest on the U. S. Indian School field under a sage bush which contained ten eggs on the verge of hatching. As it was at an altitude of 7,000 feet and several days before the nest was found ice had formed a quarter of an inch thick on quiet pools, some fortuitous circumstance must have led to the phenomenally late nesting. When the young are raised these delightful little Cotton-tops go about in small flocks visiting water holes and river bottoms. Picking up insects, seeds, and berries as they go, they wander through brushy arroyos, over juniper-clad foothills, cactus flats, and sagebrush or mesquite plains calling to each other with a nasal *pay-cos*, *pay-cos*, which by long association comes to take on the charm attaching both to the gentle-eyed birds themselves and to the fascinating arid land in which they make their homes.

GAMBEL QUAIL: *Lophortyx gambeli gambeli* (Gambel)

PLATE 19

DESCRIPTION.—*Length*: About 9.5-10 inches, wing 4.4-4.7, tail 4.1-4.7, tarsus 1.2. *Adult male*: Head with long black decurved plume (about 1.5 inches);



GAMBEL QUAIL

FEMALE

MALE

black face and *rufous crown* separated by white line, the U-shaped face line outlining the black throat; back bluish gray, wing edgings giving effect of white stripes; breast gray, *belly buffy with black patch*; *flanks rufous streaked with white*. Iris brown, bill black, legs and feet greenish gray. *Adult female*: Similar, but crest only about an inch long and plumage without striking markings, *belly uniform buffy, white-streaked flanks chestnut*. *Young*: Upperparts brownish, minutely mottled, shoulders and wing coverts with white shaft streaks and black spots at tip; breast and sides pale ashy brown with whitish bars, *belly white*.

RANGE.—Lower Sonoran desert region of southern California, southern Nevada, Arizona, southwestern Utah (introduced and thoroughly established in western Colorado), and from southwestern New Mexico (taken in northwestern New Mexico 40 miles southwest of Fort Lewis, Colorado) to the Rio Grande and El Paso region of Texas south to Guaymas, Sonora, and the northeastern corner of Lower California.

STATE RECORDS.—A rather restricted area in southwestern New Mexico represents the principal natural range of the Gambel Quail in the State. It is confined to the hot valleys and lower slopes, mainly in Lower Sonoran Zone, in valleys of the Rio Grande, Mimbres, Gila, and San Francisco Rivers and tributaries of their drainage systems; being most abundant in the valley of the Gila up to Cliff and in that of the San Francisco to Glenwood, while a smaller number range up the Gila to Sapello Creek (Bailey), the mouth of Beaver Creek, 6,400 feet (Ligon), and up the San Francisco valley to Joseph (Bailey). [Outside these valleys it occurs in the southwestern part of the State—in the Silver City, Cloverdale, and Rodeo sections—but only locally and near water (Ligon, 1927, p. 137). It was common, May 9, 1920, about San Simon and also Silver City (Ligon).] In the valley of the Rio Grande it occurs from about 100 miles south of the New Mexico-Texas boundary to Belen. It has probably a continuous range connecting the areas along the southern foothills of the Mogollon Mountains (Fisher), the Gila (Birdseye), Silver City (Marsh and Kellogg), the Mangos Valley (Goldman), the valley of the Mimbres and the Rio Grande (Ligon). It is here found occasionally to 7,000 feet altitude.

Many years ago an effort was made to introduce this species near Fort Union, and specimens taken or reported from the upper Rio Grande Valley may be descendants of these introduced birds. Others were transplanted between 1909 and 1911, from the southern to the northern and eastern counties where none had been previously. [In San Juan County, they have become well established on the San Juan and its tributaries. Some that were transplanted to the grounds of the Rio Grande Gun Club, about 5 miles south of Albuquerque, are said to have been increasing in numbers for several years (Ligon, 1916-1918) and they have been fairly well established on the Rio Grande, west and northwest of Santa Fe.] On his Uracca Ranch, George W. Webster, Jr., of Cimarron, introduced them successfully. A flock of 20 were seen near Cimarron August 29, 1913, and others reported frequently seen along the base of Eagle-tail Mountain; also a flock of seven was seen near Koehler Junction, October 24, 1913 (Kalmbach).

In December, 1915, a "good increase" was noted in the abundance of the species in New Mexico, 1915 having been "a banner year" for all the quails of the State. Along Cuchillo Creek, west of the Elephant Butte Dam, they were very common. [In 1916, they were "well distributed and abundant in the Rio Grande Valley as far north as Albuquerque," but none were found in the Pecos Valley. On the east they extended to the San Andres Mountains northeast of Las Cruces. They were common in the southwest and north to Aragon and were observed west of Reserve in the San Francisco Range to about 6,500 feet. Their greatest abundance seemed to be between Elephant Butte and Rincon in the Rio Grande Valley. Several bunches and young two weeks old were seen near Cuchillo, July 17, 1916" (Ligon,

MS). On the Rio Grande Bird Reserve they were abundant, November 23–December 9, 1916 (Willett). In March, 1919, it was found that the three years' drought, while it had greatly reduced their numbers in the Rio Grande Valley, had not affected them as much as the Scaled Quail, which normally live farther from water.]—W. W. COOKE.



MAP 6. GAMBEL QUAIL

Shaded areas show natural breeding range. Introduced range not shown (see text)

NEST.—A slight hollow scratched in the ground usually beside a bunch of grass or other protection, sometimes without lining, but generally slightly lined with bits of grass or leaves. **Eggs:** 10 to 12, white to buffy, spotted and blotched with brown and drab, the blotches with a purple or pinkish bloom.

FOOD.—The food of 28 adults, collected from January to June consisted almost wholly of vegetable matter, over 63 per cent leaves and plant shoots, nearly 32 per cent miscellaneous seeds, and less than 4 per cent grain, but in summer, mistletoe berries, tender mesquite foliage, and fruit and seeds of cactus are among the vege-

table foods eaten. As Merrill reports, however, the food in summer, though partly weed seed and a little vegetation, is "essentially insects, mainly grasshoppers." Ants, leaf hoppers, stink bugs, cucumber beetles and other insects eaten by the quail point to the value of the chicks which, like other young, are doubtless highly insectivorous.

GENERAL HABITS.—The handsome Gambel Quail, locally but incorrectly called California Quail, with its black decurved plume, black and buffy belly, and striped chestnut sides, may be met with in the Lower Sonoran Zone in quail brush (*Atriplex lentiformis*) and creosote, and in hot mesquite valleys or their brushy slopes, in screw bean and palo verde thickets and among patches of prickly pear. It is not generally found so far from water as the Scaled Quail, which eats more juicy insect food, but at times both are seen in the same landscape.

An interesting hybrid of the Scaled and Gambel Quails was taken from a covey of Gambel Quails on November 26, 1916, by Mr. W. E. Watson of Whiskey Creek near Pinos Altos, not far from Silver City. It was apparently an adult male in mature plumage. Its parentage was evident although the scaling was striking and the general characters of the Scaled Quail predominated over most of the body. The crest and head and belly markings were a compromise between the two. The specimen was sent to Mr. R. T. Kellogg who forwarded it to me for examination and record in the Biological Survey, after which, at Mr. Kellogg's request, I sent it to the artist, Louis Agassiz Fuertes. In acknowledging its receipt he wrote on August 4, 1927, "The beautiful little '*Calliphortyx*' or '*Lophocheila*' is so pretty and interesting that I am going to paint it before shipping it on to Mr. Kellogg. The presence of rufous as a substitute for a half developed black is very significant. It is often, as you know, the female substitute for male black (Merganser heads etc. etc.) and the crest just half way between the parents in character and the throat show this very nicely" (Auk, 1928, p. 210).

In inhabited regions, in places where cattle trails lead to water, the Gambel's pretty foot prints call up pleasant pictures of morning procession of thirsty little "black-helmeted" pedestrians, talking cheerfully as they go. For it "seems most at home about small farms, such as those cultivated by the Spanish-Americans, which dot the narrow canyons and river valleys" (Ligon, 1927, p. 135). It often lives in alfalfa fields and nests in vineyards. Its nesting season extends from June well into August. In 1913, Professor Merrill reported—"a pair nested on the State College grounds under a shadscale, bringing out the batch of young on June 8th. On July 5th a flock of twenty young and old was noted in the Organ Mountains at about 6,000 feet. Old and young may be seen by hundreds in the valley in the sandy regions covered with mesquite, among the tornillos and in the cultivated tracts as well" (MS).

Their greatest enemies are "snakes, rats, rock squirrels, skunks, and other vermin" (Ligon, 1927) which destroy their nests; for in the brush which they frequent they can hide from the hawks.

Where not molested the Quail become so abundant that they may at times be injurious to garden crops. Near Palomas the Mexican farmers complained that they pulled up the young beans as soon as they began to appear, and later picked off the flowers, finally eating the ripened beans. These complaints were so insistent that the State Game Warden reduced the numbers of the birds by trapping them and shipping them to other parts of the State where they would be of benefit. When not too numerous the Quails are decidedly beneficial, as their list of food attests.

Aside from the economic importance of the handsome Gambel, it adds greatly to the interest of the country, and to the camper and the leisurely traveler it is among the most memorable birds met with. As it thrives under desert conditions if it can get to water, it has been suggested that it might perhaps be successfully introduced in certain parts of the arid regions of Colorado and Texas, as well as in new territory in New Mexico.

This raises an important question, discussed by Doctor Grinnell in his suggestive paper, "A Critical Factor in the Existence of South-western Game Birds," that factor being water. Here he offers a vital consideration for those contemplating introductions. "Briefly," he says, "a brood of newly hatched quail must find itself within walking distance (walking distance, be it emphasized, for the *little* quail) of water to drink by them within a few hours of hatching. . . For without water the young are doomed to perish, if time of hatching happens to fall within a rainless or dewless period of weather" (1927, p. 528).

In the thickets along the valley bottom at Gila, Major Goldman found the birds "in large, loose flocks, rather tame, but preferring to keep out of sight" in thick brush, or by the river in low, thick-topped trees. As he says, "when they think they are hidden they often allow one to approach to within a few feet, and then begin flying a few at a time calling to each other in alarm . . . often fluttering rather clumsily through the brush as they gradually scatter . . . when all is quiet they begin calling and answering one another in more confident tones, until the flock is gathered again" (MS).

When a flock is feeding on the ground, a handsome cock will often act as sentinel, perching in the top of a bush overlooking the landscape, and on the approach of an enemy give an alarm note that is instantly obeyed.

About ten miles north of Silver City, a covey roosted near our camp. One morning at daybreak, as the clouds were reddening before the sun rose, they ran down among the oak bushes with plumes curved forward

over their bills, all talking at once, some calling *whee-whit'* or *ka-wha-whee'-ah* and others talking softly as they trotted about or chased each other playfully. When they caught sight of us they gave the alarm with a sharp *quit quit*. As they ran about, the black and buffy belly markings showed well, distinguishing the male and female at a glance. For ground birds there could be no better recognition mark, and where two species of quails occur together as they do here, and both frequent the brushy thickets, it is not difficult to imagine that the difference in belly markings may be useful in keeping flocks of a kind together.

While those met with far from habitations may be really wild or "rather tame" according to their experience in life, the birds readily become used to people under proper conditions and afford many delightful experiences. On the large grounds of a school in Arizona, Mr. Gilman found five nests. One was in the open passed by the children on their way to school. To protect it from the sun Mr. Gilman by daily advances shoved a plank toward it till the eggs were shaded, "the old bird apparently paying no attention to the intrusion." Two nests were in the school woodpile, and another in a pile of boards and kindling about ten feet from the school woodshed. Encouraged by these evidences of trustfulness, Mr. Gilman put some straw in an old nail keg and laid it on its side in the shelter of some mesquite saplings, and three weeks later, as he says, "found that a Quail had moved in and laid two eggs. Later she completed the set, only eight eggs, and successfully hatched all but one. She was quite tame on the nest and would not be scared off by any mild measures." To test her, Mr. Gilman goes on, "I tried hammering on the rear of the keg, rolling it gently and talking to her, requesting her to get off and let me count the eggs, but unless I put in my hand at the front of the keg she sat pat" (1915a, p. 87).

ADDITIONAL LITERATURE.—JUDD, S. D., U. S. Dept. Agr., Biol. Surv. Bull. 21, 1905 (food).—WILLARD, F. C., Condor, XIV, 60, 61, 1912 (nest).

MEARNS QUAIL: *Cyrtonyx montezumae mearnsi* Nelson

PLATE 20

DESCRIPTION.—*Wing:* 4.6 inches, tail 2.3, bill .5, tarsus 1.1. Feet heavy, with large powerful claws; tail of short, soft feathers, hardly distinguishable from coverts. *Adult male:* Head curiously patterned with black and white, soft blended crest, fawn colored at tip; back pale brown streaked with white; median underparts dark brown and black, sides slaty, thickly spotted with white; iris light brown, bill, legs and feet bluish gray. *Adult female:* Head pinkish brown, without stripes; back mottled and barred with black, brown, and lavender, and streaked with white; underparts light cinnamon or lavender, breast and sides specked and streaked. *Immature male:* Resembling the adult female but underparts ochrey or whitish with black variegation. *Young:* Like female but upperparts with hammer-headed white shaft lines and underparts thickly spotted.

RANGE.—Arid Upper Sonoran and Transition Zones from central Arizona, southern New Mexico, and central Texas south to mountains of northern Coahuila, Chihuahua, and eastern Sonora.

STATE RECORDS.—The Mearns Quail occurs in New Mexico in several districts. It is a bird of the mountain slopes and higher valleys, avoiding the intervening hot treeless deserts. It is most abundant on the headwaters of the Gila, San Francisco, and Mimbres Rivers and extends up to Fort Tularosa (Henshaw), the head of the



Photograph by J. S. Ligon

FIG. 37. Mearns Quail

The curious "wall-paper pattern" of the head shows well here but would enlighten only an acquaintance, while the dark underparts are hidden in the usual crouching pose

Gila (Bergtold), to Beaver Lake (Birdseye), Silver City (Kellogg), the head of the Mimbres (Bailey), and over to the Rio Grande slope of the Black Range at Chloride and Fair View (Nelson). A second area in which the species is possibly less common enters New Mexico from Texas in the Guadalupe Mountains (Bailey), and extends along the Sacramento Mountains to the White Mountains (Hollister). [A third is the San Augustine Plains. It also occurs in the extreme southwestern corner of the State (Ligon, 1927)]; in the Animas Mountains (Goldman); the San Luis Mountains, and on the southern New Mexico boundary line to a point 60 miles west of El Paso (Mearns).

Its usual summer range in New Mexico is from about 5,000 to 8,000 feet. In fall it moves somewhat higher. In winter it retires from these higher altitudes, but does not descend much lower than the lowest part of the nesting range.

On the Carlsbad Bird Reserve, 6 were seen on January 9, and 10, on January 12, 1915, the first at 6,500 feet altitude (Willett). In the Guadalupe Mountains south of Queen, they were fairly common December 31, 1915. In Socorro [Catron] County, 15 miles northwest of Reserve, a few small bunches were seen at about 7,800 feet, February 9, 1915. They occur in the San Andres, Caballos, San Mateo, Magdalena, and Datil Mountains. In 1915 there was a good increase in their numbers. They were common at the north end of the Cuchillo Mountains, April 18, 1915. [In 1916 they were "not abundant, but well distributed over the southern portion of the State." On July 8, 1917, several pairs were seen on Main and South Diamonds, west slope of the Black Range, mainly with young about a week old. Ten years later they were "most common in the Black Range, along the precipitous rims and canyons that encircle the San Augustine Plains, and in the desert mountain ranges of the extreme southwestern section of the State. They are not found east of the Pecos River in New Mexico" (Ligon, 1927, p. 140).]—W. W. COOKE.



MAP 7. MEARNS QUAIL
Shaded areas show breeding and resident range

NEST.—So far as known, a depression in the ground well lined and partly concealed by grass, or a bulky mass of grass like a rat's nest, the grass pulled up by the bird, and with one small entrance. *Eggs*: Usually 10-12, white.

FOOD.—As far as known, lily bulbs— $\frac{3}{4}$ of the food in 5 specimens, and to judge from their large strong digging feet provided with sharp claws perhaps the principal article of their diet—also great numbers of acorns and pinyon nuts, and in addition seeds and spines of prickly pear, acacia, seeds of legumes and spurge, grass blades, berries of mountain laurel, arbutus, and cedar, and such insects as weevils, caterpillars, bugs, crickets, and grasshoppers.

GENERAL HABITS.—The striking contrast between the plumage of the Scaled and Mearns or "Fool Quails" is explained by their habitats. Imagine a dark-fronted Mearns on the bare gray ground of the treeless desert or among the open desert bushes frequented by the pale blue Scaled Quail. He would stand out rods away! But in the grassy valleys and on the rocky, brushy slopes of the mountain gulches, he is part of the landscape. As he flushes from the grass at your feet, the striking color of his underparts and what Mr. Fuertes well calls the "wall-paper pattern" of his head are hidden from you, and his streaked back fits in so well with the streaked ground cover that he vanishes before your very eyes, to be seen no more unless almost stepped on, when he again bursts away with his quavering call. This habit of "lying very closely" and taking flight only when nearly trodden on, is responsible for his name of "Fool Quail," and by its means, as Mr. Fuertes pointed out in his interesting article in the Condor (1903, p. 115), he hides the conspicuous brown and black of his underparts. The painting of this remarkably patterned quail (facing this page), from a study made when Mr. Fuertes was camping with Mr. Bailey in the Chisos Mountains, Texas, shows the spot where the artist, waking from his sleeping bag at sunrise, first saw the bird he had been eager to meet with. When the Quail also discovered him, as Mr. Fuertes describes it, in his excitement he "quickened his trot, compressed his plumage, and raised his head to its highest, as a guinea hen will do when slightly alarmed. But accompanying this action he displayed his curious crest in a peculiar and striking way. Instead of raising it as a bob-white would have done, he spread it out laterally, like half a mushroom" (in Handbook, pp. 123-124). This mushroom pose of the crest is most interestingly depicted by Mr. Fuertes in his Condor article (1903, facing p. 113).

The low call of the Mearns Quail, suggestive of the quavering cry of a Screech Owl, adds to the fascination of the pursuit of this illusory bird, for it is ventriloquial in quality and leads you such a fruitless chase that you return to camp with an exaggerated interest in this feathered Will-o'-the-wisp. If fortunate you may find where the bird has been and by looking about get a clue to its habits.

On a steep south slope where the snow soon thaws, Mr. Ligon once



MEARNS QUAIL

NEST.—So far as known, a depression in the ground well lined and partly concealed by grass, or a bulky mass of grass like a rat's nest, the grass pulled up by the bird, and with one small entrance. *Eggs*: Usually 10-12, white.

FOOD.—As far as known, lily bulbs— $\frac{1}{4}$ of the food in 5 specimens, and to judge from their large strong digging feet provided with sharp claws perhaps the principal article of their diet—also great numbers of acorns and pinyon nuts, and in addition seeds and spines of prickly pear, acacia, seeds of legumes and spurge, grass blades, berries of mountain laurel, arbutus, and cedar, and such insects as weevils, caterpillars, bugs, crickets, and grasshoppers.

GENERAL HABITS.—The striking contrast between the plumage of the Scaled and Mearns or "Fool Quails" is explained by their habitats. Imagine a dark-fronted Mearns on the bare gray ground of the treeless desert or among the open desert bushes frequented by the pale blue Scaled Quail. He would stand out rods away! But in the grassy valleys and on the rocky, brushy slopes of the mountain gulches, he is part of the landscape. As he flushes from the grass at your feet, the striking color of his underparts and what Mr. Fuertes well calls the "wall-paper pattern" of his head are hidden from you, and his streaked back fits in so well with the streaked ground cover that he vanishes before your very eyes, to be seen no more unless almost stepped on, when he again bursts away with his quavering call. This habit of "lying very closely" and taking flight only when nearly trodden on, is responsible for his name of "Fool Quail," and by its means, as Mr. Fuertes pointed out in his interesting article in the Condor (1903, p. 115), he hides the conspicuous brown and black of his underparts. The painting of this remarkably patterned quail (facing this page), from a study made when Mr. Fuertes was camping with Mr. Bailey in the Chisos Mountains, Texas, shows the spot where the artist, waking from his sleeping bag at sunrise, first saw the bird he had been eager to meet with. When the Quail also discovered him, as Mr. Fuertes describes it, in his excitement he "quickened his trot, compressed his plumage, and raised his head to its highest, as a guinea hen will do when slightly alarmed. But accompanying this action he displayed his curious crest in a peculiar and striking way. Instead of raising it as a bob-white would have done, he spread it out laterally, like half a mushroom" (in Handbook, pp. 123-124). This mushroom pose of the crest is most interestingly depicted by Mr. Fuertes in his Condor article (1903, facing p. 113).

The low call of the Mearns Quail, suggestive of the quavering cry of a Screech Owl, adds to the fascination of the pursuit of this illusory bird, for it is ventriloquial in quality and leads you such a fruitless chase that you return to camp with an exaggerated interest in this feathered Will-o'-the-wisp. If fortunate you may find where the bird has been and by looking about get a clue to its habits.

On a steep south slope where the snow soon thaws, Mr. Ligon once



MEARNS QUAIL

almost stepped on one of a small bunch when feeding. As he stopped and remained quiet, they all "got up from their diggings and uttering a low note of alarm sneaked down the hill into a gulch, and squatted" (MS). A pair that Mr. Bailey started at the head of the Mimbres at about 8,000 feet had been scratching under the pine trees. "In the freshly scratched ground," he says, "I found a quantity of membranaceous shells of a little bulb—probably *Cyperus*—and several of the bulbs. I ate one of these and found it good, starchy, juicy, crisp, and of a nutty flavor. The Quail had dug two or three inches deep in the hard ground and seemed to find plenty of bulbs, but I could not find one by digging new ground, nor could I find the plant which bore them" (MS).

Unlike the Gambel Quail the Mearns Quail does not gather in large flocks. Though well distributed, as Mr. Ligon says, the birds are nowhere abundant. He thinks there are usually about six in a bunch, though they range from two to twelve. He says that the number of birds that may be found at any point in their range varies more than is the case with any game bird that he knows; food, character of breeding season, and deep winter snows, probably combining at times to reduce them to the verge of extermination over great areas. For several seasons they were said to be very abundant on the Mescalero Indian Reservation but then as the result of bad winter weather during a term of years almost disappeared, the same being true in other districts of the Southwest. A variety of natural enemies affect their abundance. The Cooper Hawk Mr. Ligon considers the worst enemy, responsible for their small coveys. But the predatory animals are also important factors in their abundance. In the center of the Mearns' distribution in the Black Range in 1915, while they were protected by the rank vegetation of a good season, Mr. Ligon says they were also profiting by four years of active trapping of skunks, bobcats, and foxes. One trapper had a record of forty-five foxes in four nights, and forty-one bobcats in a year. As the birds increased in numbers, the ranchers and cowboys said they were "coming back."

"Often in midwinter," Mr. Ligon reports, "I observe two of the birds—a pair—together. By May 15th they are generally paired but I believe it is late in June before they lay, as young are always late in hatching" (MS). As late as the middle of September, half-grown young have been found. On August 21 (1901), in the Guadalupe Mountains we flushed a family of old and half grown downy young. The parents flew with their quavering call and also a single nasal note, leaving the brood so well hidden that in tramping all around the place we found but one, and that only by nearly stepping on it.

When on the Wheeler Survey in the White Mountains of Arizona, Mr. Henshaw, under date of August 10, wrote—"while riding with a party through a tract of pine woods, a brood of eight or ten young, accompanied by the female, was discovered. The young, though but a

week old, rose up almost from between the feet of the foremost mule, and after flying a few yards dropped down, and in a twinkling were hidden beneath the herbage. At the moment of discovery, the parent bird rose up, and then, tumbling back helplessly to the ground, imitated so successfully the actions of a wounded and disabled bird that, for a moment, I thought she must have been trodden upon by one of the mules. Several of the men, completely deceived, attempted to catch her, when she gradually fluttered off, keeping all the time just beyond the reach of their hands, till she had enticed them a dozen yards away, when she rose and was off like a bullet, much to their amazement" (1875, pp. 443-444).

In the Huachuca Mountains Mr. F. C. Willard had the good fortune to discover a family at the nest. As he says, "the male sat in the entrance of the nest with his head ducked down, while from between one wing and his back a little striped head protruded. Stooping I looked into the nest and there sat the female with one small chick on her back and a row of them poking their heads out all around her" (1913, p. 227).

Though at times wild, the Quail, as instanced by Mr. Ligon and Mr. Henshaw, are at other times surprisingly unafraid. Mr. Ligon came upon a late family—two parents and six almost grown young—October 25, 1915, when he was riding up the gorge of Beaver Creek. As he writes, "I saw one get up at my horse's side. I stopped and all got up and slowly walked out to the rocks and bushes a few feet away, uttering low notes of alarm. None flew" (MS). Mr. Henshaw had a still more surprising though more easily explained experience, for as he writes: "Of the several quail known to me the 'fool quail' of New Mexico and Arizona seems to depend for his safety upon his protective coloration more than any other. As an example I recall one that squatted on a log near the trail our pack train was following, and so closely did the colors of his back and sides harmonize with his surroundings that twelve or fifteen pack mules and horsemen passed by him without seeing him or disturbing his equanimity in the least. He seemed so completely petrified by astonishment at the novel sight as to be incapable of motion, and he was so close to us that one might have touched him with a riding whip. While the bird was no doubt actuated to some extent by curiosity, he depended for his safety, I am sure, upon the nice way in which his plumage matched his surroundings, and upon his absolute immobility. No one saw the bird but myself, and when the train had passed I had to almost poke him off his perch before he consented to fly. Whoso calls this the 'Fool Quail' writes himself down a bigger fool than the bird, who has been taught his lesson of concealment by Mother Nature herself" (MS).

ADDITIONAL LITERATURE.—SWARTH, H. S., *Condor*, XI, 39-43, 1909.

PHEASANTS: Family Phasianidae

RING-NECKED PHEASANT: *Phasianus colchicus torquatus* Gmelin

DESCRIPTION.—*Male*: Length about 30 inches, wing 9.5–10.5, tail 17.5–20. *Female*: Length about 20–24 inches, wing 8.5, tail 11–12. A tuft of elongated feathers over ear, and leg with a small spur (in male); wings strong, short and rounded; tail much graduated. *Adult male*: Head and neck, except for scarlet naked cheek patch and grayish green crown, mainly iridescent black or green down to white collar; breast rich bronze with conspicuous metallic sheen, feather edgings giving scaled effect; middle of belly steely blue black, sides and flanks yellow; forepart of back yellowish with black markings, middle of back and shoulders chestnut red, spotted with white and black, lower back and rump mainly grayish green; long pointed tail yellowish, banded with black; iris yellow, bill light gray, feet brownish gray. *Adult female*: Smaller, mainly brownish, slightly scaled on back but pale brown on breast; tail brown, barred with black and pinkish brown; iris yellowish, bill light gray, legs and feet brownish. *Young in juvenal plumage*: Upperparts dark brown or blackish, top of head and back of neck with yellowish spots, rest of upperparts with yellowish shaft streaks and margins; throat white or buffy, breast brownish, tinged with rusty; belly whitish or buffy, sides and flanks marked concentrically with brownish, blackish, and dull white.

RANGE.—Native in lower Amur, Manchuria, Korea, and eastern Mongolia, south through eastern China to Canton. Introduced into various countries in Europe and America and in twenty-five or more of our States.

STATE RECORDS.—Ring-necked Pheasants have been introduced in various parts of New Mexico during the last 20 or 30 years, but apparently with little success. Captain M. S. Murray, U. S. A. retired, at one time Deputy Game and Fish Warden for the propagation of the Pheasants, raised "quite a few" at Roswell, but before being able to carry out his plan of propagation in southern New Mexico had to leave the State, and sent those that he had raised to the Pajarita Mountains on the Mescalero Apache Indian Reservation (MS). Others were introduced on the W. S. Ranch at Cimarron and Mr. William French, under date of September 9, 1918, wrote—"They did fairly well for a number of years, but did not increase very rapidly as they had so many enemies to contend with—wild cats, coyotes, skunks, and worst of all, magpies. There are some still around but they seem to have disappeared more rapidly within the last two years. Prior to that time there were probably a couple of hundred within a radius of six or seven miles, but as the Magpies increased



From Biological Survey

FIG. 38. Ring-necked Pheasant

Its unusual form and coat of many glistening colors make it a striking oriental figure strangely out of place in a New World landscape

they have become scarcer (MS)." Mr. William H. Bartlett wrote that at one time he released about three hundred Ring-necks on his Vermejo Park ranch, but added, "being ground nesting birds they were destroyed by the wild animals and none are now living (MS)." Mr. Aldo Leopold writes that in 1916 a number of Ring-necked Pheasants were liberated in the Rio Grande Valley and that he afterward saw one individual in the neighborhood of Albuquerque, but that they seem to have disappeared since then (MS).

NEST.—Usually in open fields, in a tussock of grass or perhaps under a small bush; made of leaves, grass, straws, etc. **Eggs:** Generally 6 to 12, olive brown to pale blue or bluish green.

FOOD.—Grain (largely waste), weed seed and insect pests, including alfalfa webworms; the chicks being especially fond of aphids, flea beetles, etc.

"Its economic status depends upon local conditions; harmful to truck gardens and field crops in certain localities, at certain seasons and under certain conditions; neutral or useful in other localities, at other seasons and under different conditions" (Henderson, 1927, 185).

GENERAL HABITS.—"The Pheasant," we are told by Mr. W. T. Shaw in his book on the China Pheasant in Oregon, "is primarily a bird of the fields, showing only a slight tendency to seek the shelter of the foothills during winter. . . In the brush of the lowlands, or from the open meadow, comes his two-syllabled call in the stillness of the evening twilight. From his roost among the grass or sedge tussocks, or the great moss-covered branches of an oak, he springs away into the gloom with a startled cry. Throughout the long dry summer the young are reared by the female, until the days of autumn come; the male meanwhile frequently greeting you by the roadside with a glance of curiosity mingled with reserve, standing a moment, erect, in all his brightness of coloration, ducking an instant later to steal silently away among the grass" (Shaw, 1908, pp. 18-19).

ADDITIONAL LITERATURE.—BADE, AUGUST, Calif. Fish and Game, XIII, 77-92, 1927 (game bird farming).—BEEBE, WILLIAM, A monograph of the Pheasants, 1918-1922; Pheasants, their lives and homes, 1926.—MCATEE, W. L., U. S. Dept. Agr. Farmers' Bull. 1521, 13-36, 1927 (propagation).—OLDYS, HENRY.—U. S. Dept. Agr. Farmers' Bull. 390, 1910 (propagation).

TURKEYS: Family Meleagridae

The turkeys have both head and neck naked, wrinkled, and wattled, with an erectile process on the crown, a dewlap on the throat, and spurs on the legs. It is an American family, a Mexican form being the progenitor of the domestic stock, which was established in Europe in 1530 (Eaton).

WILD TURKEY: *Meleágris gallopávo silvéstris* Vieillot

DESCRIPTION.—Similar to *Meleágris g. merriami* (p. 231), but tail tipped with deep rusty, and the coverts and feathers of the lower rump *rich dark chestnut*, instead of buffy whitish.

RANGE.—Eastern United States. From Nebraska east to Pennsylvania and Virginia and south to Gulf coast and northeastern New Mexico.

STATE RECORDS.—In 1820, Major Long, on his expedition from Pittsburgh to the Rocky Mountains, found turkeys common at the junction of the Purgatory and Arkansas Rivers. There his party divided, and Say's division, which followed down the Arkansas, did not report seeing them until they were about where Wichita is now; Long's division, which went south into New Mexico and traversed the northeastern part of the State, first recorded them in New Mexico along the Mora River near its junction with the Canadian River. Here he reported seeing daily "numbers of antelope with some signs of bear, deer, and turkeys" (in James, 1823, Vol. 2, p. 96). In 1832-33, Latrobe reported killing twenty turkeys in the region of the North Fork of the Canadian River, and when Abert explored the valley of the Canadian River, in 1845, he found turkeys abundant September 4, when about ten miles west of the Texas-New Mexico line. They continued to be common all the way down the river to its mouth in Oklahoma. As the Oklahoma birds are certainly *silvestris* and the range was continuous thence to eastern New Mexico along the Canadian River, it is safe to assume that the New Mexico birds belonged to the same form. Abert recorded turkeys as common at Bent's Fort on the Arkansas River in Colorado, the starting point of his expedition, and as present up the Purgatory River to its source near Raton Pass. These, of course, were *merriami*. He does not mention seeing the birds from the east side of Raton Pass for the next hundred miles, or until he was far out on the plains. It is interesting to note that he began to see them soon after he found plum thickets, which are favorite turkey resorts.

No subsequent travelers have noted the turkey in this district and it seems certain that the ranges of *silvestris* and *merriami* did not meet, but were separated by the whole foothills country in northeastern New Mexico and by more than two hundred miles of treeless plains in Colorado and Kansas.—W. W. COOKE.

ADDITIONAL LITERATURE.—WRIGHT, A. H., Auk, XXXI, 334-358, 463-473, 1914; XXXII, 61-81, 207-224, 348-366, 1915 (early records).

MERRIAM TURKEY: *Meleágris gallopávo mérriami* Nelson

PLATE 21

DESCRIPTION.—*Male*: Length 48-50 inches, wing 21, tail 18.5, weight 16-40 pounds (average about 12 pounds); [one gobbler of about 30 pounds had a tail of 17 inches, spurs 1 inch, and beard 10 inches (Ligon)]. *Female*: Smaller. *Adult male*: Head and neck bare, dull bluish violet; top of head creamy white, bluish violet in the creases; wattles, hanging from base of bill, red washed with creamy white, at base pale ochraceous-buff; chest with bristly tuft of beard; feathers of underparts metallic bronzy green and reddish, tipped with velvety black; feathers of lower back and rump metallic, tipped with black; tail, tail coverts, and feathers of lower rump broadly tipped with buffy whitish. *Adult female*: Similar, but smaller and duller.

RANGE.—Transition and Upper Sonoran Zones in mountains of southern Colorado, New Mexico, Arizona, western Texas, northern Sonora, and Chihuahua, breeding in or near Transition Zone yellow pines, and wintering in Upper Sonoran nut pines and junipers or lower.

STATE RECORDS.—The report of turkeys seen near Taos in 1540 by members of the Coronado Expedition constitutes probably the earliest bird record within the confines of the present State of New Mexico. (In the early days, they were found in all timbered mountains of the State and in only a few isolated areas have they been exterminated—principally Animas, Guadalupe, Gallina, Magdalena, Sandia and Turkey Mountains (Ligon, 1927).] In 1824, Timothy Flint reports, James O. Pattie of Kentucky "saw great numbers of . . . turkeys" in Socorro County; and in the beginning of 1825 he reported fat turkeys along the banks of the San Francisco

River and along its tributary, Bear Creek. In their days of abundance they were found on the mountain sides and nested most commonly at 8,000–9,000 feet.

While not migratory in the ordinary sense of the word, yet they often moved higher, even to timberline, in the late summer and fall and retired to the lower country during the winter. In the Manzano Mountains during October, 1903, they were found on the ridges clear to the summit at 11,000 feet (Gaut), though most common at 8,500 feet and not seen much below 8,000 feet. [Now nearly exterminated in the Manzanos and Sandias (Leopold, 1919).] On the upper part of the Pecos River, near Pecos Baldy, a specimen was taken July 27, 1903, at 10,000 feet (Bailey), and a month later the birds had become most common down at 7,000–7,500 feet where they found the nuts of the pinyon pine. [In October, 1918, while not common, they were pretty well distributed throughout the Sangre de Cristo range from Glorieta on the Santa Fe Railroad to the Colorado line. Considerable turkey sign was noted on Pot Creek and the Little Rio Grande, 10 to 20 miles southeast of Taos. In the northeast they were reported rather abundant in the mountains about Cimarron (Ligon).]

In the Mogollon Mountain region where they were common prior to 1916, they also descended in winter. At the north end of the Tularosa Range, in 1913, a bunch of seven came to the Mayberry Ranch and in 1915 it had increased to 40 (Ligon). They were common in the fall at Reserve, 6,000 feet (Birdseye), and on October 31, 1906, a large flock was seen on Bear Creek near Cliff at about 5,000 feet (Bailey), and noted 20 miles east of Silver City (Kellogg). Along the Rio Grande, they descended still lower in the winter and were common December, 1824, in the bottomlands near Socorro at about 4,500 feet (Thwaite). They remained all winter, 1912–13, at 7,500 feet, in the Gila forest reserve (Ligon). On both sides of the Black Range, from Chloride to Diamond Creek, in September and October, 1915, Turkey sign, tracks, and bunches of Turkeys were found. [June 17, 1920, a nest was found by B. V. Lilly, with 9 eggs, 22 miles southwest of Chloride, at 7,000 feet (Ligon).] From November 9 to December 3, 1915, at Lake La Jara on the Jicarilla Reservation, 12 were taken (H. H. Sheldon). In January, 1915, west of the Carlsbad Bird Reserve they were noted, though rarely (Willett). In the Guadalupe Mountains in Turkey Canyon south of Queen, where they were formerly abundant none have been seen since 1906.

[In 1916–1918, they were holding their own remarkably well and increasing in some districts, doubtless owing to the destruction of predatory animals (Ligon). At Lake Burford in 1918 old sign was seen, and farther south the birds were reported as fairly common (Wetmore). In 1922, in northern Santa Fe County they were locally quite common, nesting well up in the mountains during the latter part of May. Sheepherders and ranchers reported nests with as many as 18 eggs (Jensen). In 1924, one was seen in Uraca Canyon, about 9 miles southwest of Cimarron, in Colfax County. They were quite abundant in that locality and were heard gobbling. Considerable sign was seen after this date west of Elizabethtown and on the head of the Red River. In 1927, the records showed that "the most extensive and suitable Turkey range in the State and where the birds have remained most abundant under adverse conditions is the extensive forested areas, including the Sacramento, White, Pecos, and Jemez mountains, the mountains of Colfax County and the San Mateo, Black, and Mogollon ranges (Ligon, 1927, p. 115).]—W. W. COOKE.

NEST.—On the ground in tall thick weeds or briers, lined with grass, weeds, and leaves. Eggs: Usually 9 to 12, creamy white, thickly sprinkled with round spots of rusty, brown or umber.

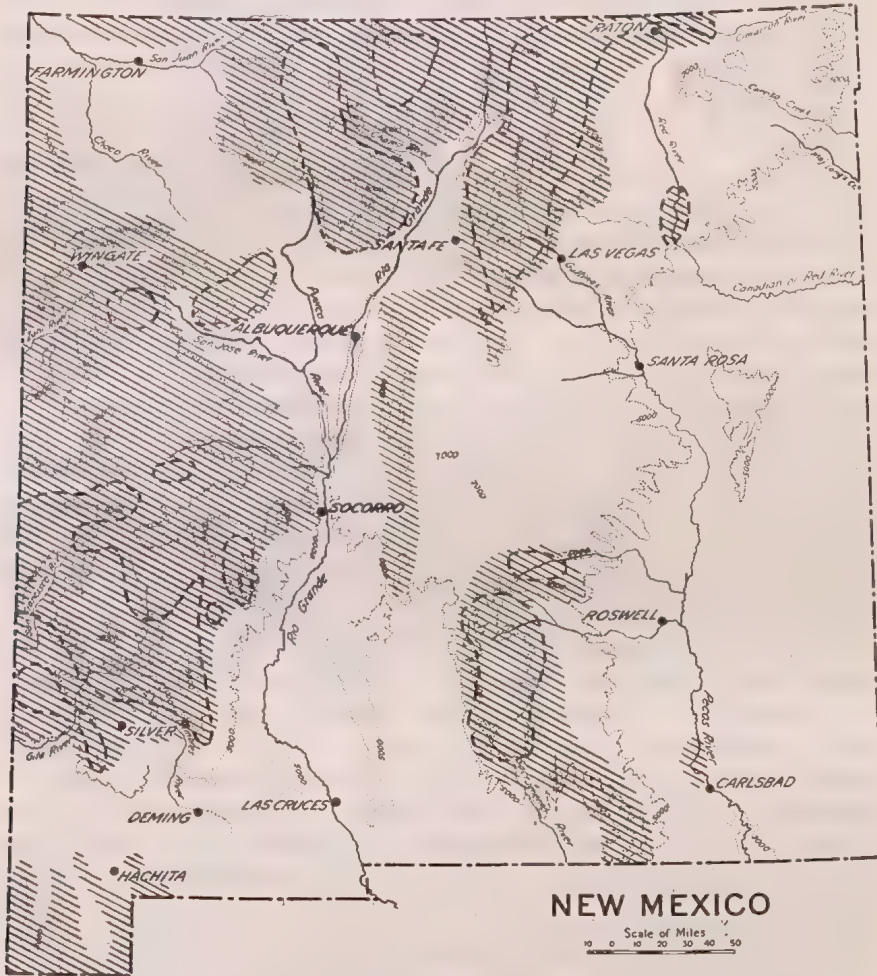


From mounted group in Colorado Museum of Natural History

MERRIAM TURKEYS

The great mountain turkey of the Southwest, king of game birds in the United States, was first seen by white men in New Mexico on the Coronado Exploring Expedition in 1540, eighty-two years before the first birds were recorded from New England after the landing of the Pilgrim Fathers

Food.—In winter pinyon nuts, acorns, and juniper berries; in summer flower buds, grass and other seeds, wild oats, wild strawberries, manzanita berries, rose haws, fruit of wild mulberry and prickly pear, grasshoppers, crickets, beetles, caterpillars, ants, and other insects. In New Mexico "the crop of a Merriam Turkey killed February 10 on Haut Creek contained 76 juniper berries, 25 pinyon



MAP 8. MERRIAM TURKEY

Shaded areas show former range. Outlined areas show 1926 range, from Ligon's game survey

nuts, 6 acorns, 30 soft worms an inch long, grass blades and some rock. The crop of a gobbler, weighing about 30 pounds and shot March 25 out of a flock of 50 in the Black Mountains, contained 30 pinyon nuts and 215 juniper berries" (Ligon). The stomach of a specimen collected near the southern end of the range contained fully a half pint of the fruiting panicles of grass (*Muhlenbergia*), a few seeds of *Bromus*, and some grass blades comprising 55 per cent; pinyon pine and other pine seeds, 45 per cent. In some localities considerate ranchmen plant small patches of oats for turkey food (Ligon, 1927).

GENERAL HABITS.—This great wild Turkey, inhabitant of the mountains of the Southwest, king of game birds in the United States, was first seen by white men in New Mexico three hundred and eighty-eight years ago, eighty-two years before the first birds were recorded from New England after the landing of the Pilgrim Fathers.

The quaint description given by Casteñada, the Spanish historian of the Coronado expedition, of these wild Turkeys seen in 1540, as "*cocks with great hanging chins*," amusingly bespeaks the impression made upon unaccustomed eyes by these remarkable birds.

In the days of one of our first government explorations, the Wheeler Survey, Mr. Henshaw wrote of their abundance and habits—"toward the head of the Gila, in New Mexico, the canyons in November were literally swarming with these magnificent birds. . . They roost at night in the large cottonwoods by the streams, and soon after daylight, having visited the stream, they usually betake themselves to the dry hills where they feed, in the fall at least, almost exclusively upon the seeds of grasses and upon grasshoppers. I think they return once or twice during the day to drink. . . Apparently the only danger they have to fear in these regions is from birds of prey, and especially the panthers. In certain portions of the Gila Canyon the tracks of these animals are very numerous; these sections always appear to have been depopulated of Turkeys, an occasional pile of feathers marking the spot where one had fallen a victim to a panther" (1875, pp. 434-435).

Some years later, members of the Biological Survey reported Merriam Turkeys quite common in the Chuska Mountains, especially near Cottonwood Pass, where their tracks were seen on many of the trails and in the mud at the edges of small lakes. The Navajos of the region never kill them for their own use, but after snow falls often bring them in for the white men, keeping the feathers and tassels for their ceremonies. Only a few Turkeys still range over Mount Taylor, where they were formerly very common. During a stay of eight days—in August, 1905—Mr. Hollister saw only one flock of five or six birds. As he reported, they were ranging in an open stretch of yellow pine country and were evidently feeding on the grasshoppers which were very plentiful there (MS). In the yellow pines of the old crater of Mount Taylor—September 21, 1906—Mr. Bailey saw a flock of about a dozen grown birds still with the hen at a creek, and tracks were found along the creek from 7,000-9,000 feet, throughout the yellow pine belt. In the Capitan Mountains hunters reported that the birds had largely been killed out, but a rancher at the east end of the range said they were numerous about his place.

At the heads of the Mimbres and Powderhorn Canyons in the Mogollon Mountains in May, 1906, tracks were still common, and as Mr. Bailey reported—"some of the scrub oak and wild oat slopes were

scratched over like a barnyard and narrow trails made entirely by Turkeys were common along the hillsides. In a few hours' tramp along the crest of the range I saw five Turkeys and in the evening and morning an old fellow gobbled from the spruce-covered slope opposite our night's camp. A few distant answers were heard. Loads of Turkeys have been hauled out of here to market in past years, but if the market hunting can be stopped there is a fair chance of the birds holding their own. The country is rough and not many hunters come in" (MS).

During January, 1913, Mr. Ligon found Merriam Turkeys abundant on a high divide north of Haut Creek in the Black Range, Socorro County, at about 7,500 feet. One of the flocks contained about fifty birds. As he reported, "they are distributed quite commonly over the Gila Reserve but begin gobbling in this district about March 25. The greatest enemies to the nests are skunks and bobcats—to the old birds, the Golden Eagle. Acorns while they last are their favorite food, but these are usually soon gathered up. In the middle of October, 1915, in Mineral Canyon near Chloride, Mr. Ligon found the ground in the bed of the canyon, under the tall oaks, "literally covered with acorns" and thickly marked with tracks. When pinyon nuts are plentiful they form the principal food of the Turkeys from September until June. Where these can not be had during winter they feed on juniper berries" (MS). To get the pinyon nuts and juniper berries in fall and to escape the winter snows they go down the mountains to the nut pine and juniper mesas, where we were told they have been wantonly killed. At Fort Wingate during six years when there had been no crop of pine nuts the birds had been very scarce, but during the seasons of plenty they are said to be fairly common about the timbered mountains south of the Fort.

The Merriam Turkeys in the Chuska Mountains were found feeding mainly on the seeds of wild chess and other grasses, manzanita berries, and rose haws. Two shot by Mr. Bailey in the canyon on Mount Taylor had eaten quite an assortment of foods including acorns, wild oats, seeds of wild parsnip, serviceberry, and other plants, leaves of vetch, grasshoppers, beetles, ants, caterpillars and other insects and gravel. One collected in the Manzano Mountains had eaten among other things half a pint of seeds of drop-seed grass, some brome-grass seeds, and grass blades. A specimen taken in the Pecos Mountains contained, besides grasshoppers and crickets, mariposa lily buds, and strawberries.

"At times, and particularly in years when there are few or no nuts," Mr. Charles Springer of Cimarron writes, "the principal food of the Merriam Turkey is wild rye, which is plentiful in the canyons and draws in our mountains and foothills. On the Suree I have often seen wild Turkeys eating the short blades of Kentucky blue grass which grows wild along the canyon near the stream and remains green all winter. One of the most important winter foods of the Merriam Turkey is the

red kinickinick berry which grows on the high ridges and plateaus in our mountains. When acorns, pinyon, and pine nuts, and other foods may be buried deep under snow, the Turkeys may find kinickinick berries on the high ridges and high places from which the snow blows off. Mason Chase tells about the wild Turkeys hunting out, or at least finding and appropriating, caches of nuts made by rodents. He says this occurred during a time when deep snow covered up all the Turkey's food except the buds of shrubs" (MS).

While each encounter with one of these magnificent birds is notable, the discovery of a roost is among the thrilling experiences of the naturalist. When in the Manzano Mountains, Mr. Gaut found besides a few scattering flocks, several old deserted Turkey roosts, and one still in use. They were at an altitude of about 8,500 feet in yellow pines on benches above dry canyon beds. At the occupied roost the birds would "congregate about dusk, scatter in the different trees—usually those not having many close branches—and leave in the mornings before sunrise in the direction of a spring where they secured water" (MS).

Though descending as low as the nut pines to feed in winter, Mr. Ligon finds that the turkeys "usually retire to the highest and most secluded areas of their range to nest" and "after the young are hatched, two to three females generally unite with their broods and raise the young in one big family. In conducting their difficult nesting activities," he adds, the female turkeys display rare foresight and courage (1927, p. 113).

In June and July, 1919, Mr. Ligon saw considerable Turkey sign about the head of the Pecos, and when out attending bear traps at about 10,000 feet, southeast of Pecos Baldy, Mr. J. T. McMullin and he saw five large Turkeys under a lone spruce on the edge of a park enclosed by heavy timber. They had presumably been feeding in the park and taken shelter from a heavy rain under the dense spruce. A few minutes later, about three hundred yards down the mountainside in a thick grove of quaking aspens, the men rode onto a hen Turkey hovering her young in an effort to keep them dry from the downpouring rain. She ran off while the young, apparently eight in number, flew farther down the mountain taking refuge in the top branches of a tall aspen, where they were almost invisible among the leaves in the rain. They were apparently about a month old, which means that the hen began laying early in May when most of that district was well covered with snow. If the nest was lower, it was probably not below 9,000 feet (MS).

On October 23, 1920, Mr. Jensen shot two birds in the Santa Fe region and the following day another. All were young weighing from eight to ten pounds each. On October 23, 1921, he met a flock of twelve in the Santa Fe Canyon, less than six miles from the city. He says that the feathers of the Turkeys are highly prized by the Pueblo Indians of

the region who use them in their ceremonial dances and as prayer stick offerings (1923b, p. 455).

ADDITIONAL LITERATURE.—GRINNELL, G. B., American Game Bird Shooting, 282-301, 1910.—MCATEE, W. L., U. S. Dept. Agr. Farmers' Bull. 1521, 45-46, 1927 (propagation of game birds).

CRANES, RAILS, etc.: Order Megalornithiformes

CRANES: Family Megalornithidae

The Cranes resemble the Herons in long necks and legs, but the head is partly naked, rough, and thinly haired, and the plumage is compact and without powder-down patches. The food is swallowed whole and the indigestible portion regurgitated in the form of a bolus. In flight the neck is outstretched, instead of being drawn into the shoulders as in the Herons.

WHOOPING CRANE: *Grus americana* (Linnaeus)

DESCRIPTION.—*Length*: 50-54 inches, wing 22-25, bill 5.3-5.8, tarsus 11-12. *Adults*: Bare red skin extending from bill to crown and cheeks, spotted with black bristles; patch on back of head, slaty; plumage mainly white, with black wing quills and their coverts; iris yellow, bill wax-yellow often tipped with black or greenish; legs and feet blackish. *Young*: Head feathered, body mainly white, but marked or mottled with rusty brown; wings like those of adults.

REMARKS.—The windpipe of the Whooping Crane, in one case 58 inches long, had 28 inches "coiled away in the breast bone" (Coues). This, like the windpipe of the Trumpeter Swan, is the trumpet through which the bird produces the loud sonorous notes for which it is named and which are said to be audible at a distance of three miles (Bent, 1926, p. 227).

RANGE.—Formerly the Central Canadian Provinces, the United States, and Mexico, east rarely to the Atlantic coast. Now almost exterminated, probably breeding only locally in south-central Canada.

STATE RECORDS.—Since the white man came on this continent, several species of birds have become extinct through his agency; and the Whooping Crane bids fair to be added to this number in the near future. Its large size and conspicuousness tend to make it the target of every man with a rifle, and as a result it has ceased to breed anywhere in the United States, where formerly it was most common in the summer, and has become very rare in migration. Sixty years ago near Fort Thorn, Henry says, the Cranes were "quite common during March and October, on their northward and southward flight—principally the young. The adults in full plumage were only occasionally seen, and never in large flocks" (1855, p. 315). It is probable that the majority of these birds, which Henry calls the young, were the Sandhill Cranes, and that the few adults in full plumage were the only Whooping Cranes he observed. There is no later record of the Whooping Crane in New Mexico.—W. W. COOKE.

FORMER ABUNDANCE.—Like the accounts of the hordes of the Passenger Pigeon, now extinct, the accounts of the days of the abundance of the Whooping Crane are among the most interesting historic records of ornithology. Nuttall, in December, 1811, while going down

the Mississippi, witnessed, as he describes it, one of the "vast migrations of the Whooping Cranes, assembled by many thousands from all the marshes and impassable swamps of the north and west. The whole continent seemed as if giving up its quota to swell the mighty host. The clangor of these numerous legions passing along high in the air seemed almost deafening . . . and as they continued nearly throughout the whole night without intermission, some idea may be formed of the numbers assembled on their annual journey to the regions of the south" (1905, pp. 73-76).

In commenting upon this "passage of mighty armies," which "fills the mind with wonder," Mr. Henshaw exclaims—"To-day what a contrast! The clangor of passing multitudes no longer fills the air, for this noble bird, whose number was legion a century ago, is now practically extinct in the Atlantic States, while only a few pairs manage to maintain themselves in far out-of-the-way places, and so delay for a few years the final extinction of the species" (1915, p. 122).

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 135, 219-231, 1926.—MERSHON, W. B., Auk, XLV, 202-203, 1928 (seen in Saskatchewan).—TAVERNER, P. A., Birds of Western Canada, 121-122, 1926 (diagram of windpipe).

LITTLE BROWN CRANE: *Grus canadensis canadensis* (Linnaeus)

DESCRIPTION.—*Length*: About 35 inches, wing 17.5-20, bill 3-4.2, tarsus 6.7-8.4. Like the Sandhill Crane (p. 239), but smaller.

RANGE.—North America to central Mexico. Breeds from the coast of Siberia, northern Alaska, northern Mackenzie, and Arctic islands south to the Hudson Bay region, Mackenzie (Great Slave Lake region), and southern Alaska; migrates through interior of United States and along the Pacific coast, and winters from southern Texas south to Jalisco, Mexico. Accidental near San Francisco in winter.

STATE RECORDS.—The type of *Grus fraterculus* Cassin was taken by Möllhausen in October, 1853, at Albuquerque. This is now known to be a synonym of *G. canadensis* and is the only record of the species for New Mexico. It breeds in the Arctic and winters in California, Texas, and Mexico, so it is probable, in spite of the lack of records, that a few do still occasionally pass through New Mexico, where they are not noted on account of their close resemblance to the more common Sandhill Crane.—W. W. COOKE.

NEST.—A hollow on the top of a bog or niggerhead, scantily lined with grass, roots, and caribou moss (Conover).

GENERAL HABITS.—On their spring arrival in Alaska, Mr. Conover found, the Little Brown Cranes "stayed pretty well to the tops of the hills and knolls where the snow had already disappeared, but as soon as most of the tundra was bare . . . scattered out in pairs all over the country." One nest was watched closely, and an amusing performance was witnessed, for when the nest was visited the old Cranes would fly off to a little side hill where a cock Ptarmigan was guarding his mate and her nest. As soon as the big birds alighted "the Grouse would ruffle up like a game cock and make a dash at the male Crane, who would jump

into the air and strike out with his long legs. . . After a little of this, the Crane would stalk solemnly away on his long legs, with the Ptarmigan in hot pursuit, but badly put to it to keep up with his enemy" (1926, p. 303).

SANDHILL CRANE: *Grus mexicana* (Müller)

PLATE 22

DESCRIPTION.—*Length:* 40–48 inches, wing 21–22.5, bill 5.1–6, tarsus 9.9–10.6. *Adults:* Bare red skin from bill to crown rough and minutely warty, with scattered black bristles; *plumage brownish gray*, with more or less silvery and buffy; iris crimson or orange, bill blackish, legs and feet black. *Young in juvenal plumage:* Head entirely feathered, plumage similar to adult but lighter and browner, varied with rusty brown.

COMPARISONS.—The variation in measurements should be considered in naming the Sandhill and Little Brown Cranes. From the herons the cranes can be distinguished by uniform coloration, and in flight by outstretched neck and feet. They are also "commonly seen on the high, dry uplands and cultivated fields which the herons never frequent" (Taverner).

RANGE.—Formerly bred from British Columbia, Alberta, Saskatchewan, Manitoba, Minnesota, and Ontario south to Ohio, Nebraska, Colorado, Arizona, Nevada, and California. Now is only known to breed in southern Canada, Minnesota, and the western and Rocky Mountain States south to northern Colorado, and (two records) California (Condor, 1927, p. 118). Winters in California, Arizona, and Texas south to Mexico and probably to Yucatan.

STATE RECORDS.—When the early exploring expeditions visited New Mexico some sixty years ago, they found the Sandhill Crane an abundant migrant both spring and fall. In 1846 it was common in migration on September 5 near Sandia, 5 miles south of Bernalillo; September 29 near Albuquerque (Emory); and October 9 near Santa Fe (Abert); it was common the next week near Albuquerque and in early November was noted near Socorro, and was still common as late as December 16. It was even more common four years later, for Col. McCall says: "This crane I found on the Rio Grande from Santa Fe to El Paso in October; but more particularly between Albuquerque and Socorro where, for 50 miles, the land appeared to be covered with them. They filled the cornfields and alighted close to the houses, never being disturbed by the gun" (1851, p. 223). In 1853 the crane was seen on the Zuni (Woodhouse). It was still common in 1874, when Mr. Henshaw visited the region. It is probable that many if not the majority of these birds spent the entire winter in New Mexico, as numbers of their fellows did as far north even as southern Colorado. Many flocks were still present in April, 1876, near Belen.

The interval since 1876 has witnessed a sad depletion in the ranks of the Sandhill Crane. Five birds were seen near Albuquerque October 7, 1900 (Birtwell); two small flocks were recorded October 22, 1904, near Espanola (Gaut); a pair were seen near Reservation Ranch, on that White Mountain Apache Reservation, Arizona, in July, 1910, and from the date were apparently breeding there (Leopold); on the Carlsbad Bird Reserve a few flocks were noted March 6, 1914; two flocks were seen going north, 31 in one flock, March 13; and about 200 were estimated March 24 and 25 (Cooper); 40–50 were noted wintering 1914–15 and a few winter yearly (Willett). On the Rio Grande near Albuquerque two flocks were seen March 21, 1914 (Cooper). [A few flocks pass southward generally about October 1 (Leopold, 1919).]—W. W. COOKE.

NEST.—A wide platform of grass or flags and rushes in marshy places, sometimes on old muskrat houses, generally surrounded by open water. *Eggs:* Usually 2, olive-buff, spotted and blotched with reddish brown.

FOOD.—Small fruits, roots, succulent vegetation, grasshoppers and other insects, frogs, tadpoles, snakes, small rodents, young birds and eggs (T. S. Roberts).

GENERAL HABITS.—In 1874, when Mr. Henshaw was accompanying the Wheeler Survey, he wrote: "The banks of the Rio Grande in Colorado furnish an autumnal home for thousands of these birds. Farther down in New Mexico, late in November, we found the banks of the river at certain points between Fort Craig and Albuquerque dotted with the forms of these huge birds which had assembled together in large flocks, drawn by the superior attractions of the region as a winter resort. They appeared very restless; now and then detachments of a dozen or twenty members separating themselves from the main body, as they fed among the marshy shallows, and shifting their ground from one point along the stream to another, or leaving it altogether, and wending their way in Indian file toward the stubble fields, a mile or so away" (1875, p. 468). In the early days in California, Doctor Heermann wrote: "In the spring I have observed large flocks start from the ground, sail around in extensive circles, gradually rising to a great height, when the signal being sounded by one or more of the leaders, they would at once fall into line and commence their migration back to the northern regions" (1859, p. 62).

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 135, 241-254, 1926.—PEARSON, T. G., Educational Leaflet 128, Nat. Assoc. Audubon Soc.—TAVERNER, P. A., Birds of Western Canada, 123-124, 1926 (courtship dances, etc.).—TORREY, BRADFORD, Nature's Invitation, 293-294, 1904.

RAILS, COOTS, etc.: Family Rallidae

RAILS: Subfamily Rallinae

The Rails and Coots are marsh-inhabiting birds whose wedge-shaped bodies, large strong legs, and short tails enable them to "thread with ease the mazes of reedy marshes," while their long toes serve as snowshoes to keep them from sinking in the mud or floating vegetation, and the slight basal membrane usually between the front toes, help them in swimming. Their wings are short, rounded, and feeble. The sexes are usually alike and seasonal changes in plumage slight. The nest is a rude structure placed on the ground or in a tuft of reeds or other herbage; the young are hatched clothed. The family, which is an ancient one, is rich in fossil species, has some flightless insular varieties, and is considered degenerate, several species being threatened with extermination.

REFERENCE.—COOKE, W. W., Bull. 128, U. S. Dept. Agr., 1914.



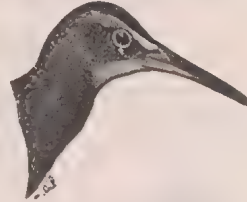
From mounted group in Colorado Museum of Natural History

SANDHILL CRANES AT THEIR NEST

The bare pinkish skin of the head stands out from the dull gray of the plumage

VIRGINIA RAIL: *Rallus virginianus* Linnaeus

DESCRIPTION.—*Length*: 8.1–10.5 inches, wing 3.9–4.2, tail 1.5–2, bill 1.4–1.6, tarsus 1.3–1.4, middle toe 1.2–1.4. *Bill* long and slender, slightly downcurved; tail short. *Adults*: Side of head gray; upperparts olive-brown, streaked with black; wing with a rufous patch; throat and breast cinnamon-brown; flanks black, barred with white, iris red, bill with lower mandible reddish, ridge and tip dusky; legs and feet apparently variable, from flesh to reddish or yellowish brown (Forbush). *Young in juvenal plumage*: Mainly black, marked or mottled with white or brown, but rufous wing patch always present; bill pink, black ringed (McLean).



From Handbook
of Western Birds

FIG. 39. Virginia Rail

RANGE.—Breeds from British Columbia, southern Saskatchewan, Manitoba, Ontario, and New Brunswick south to North Carolina, Missouri, Nebraska, Colorado (probably New Mexico), Arizona, Mexico, and Lower California; winters from British Columbia, Washington, Oregon, Utah, Colorado, Arkansas, Illinois, and southeastern states south to Guatemala, southern Mexico, and Lower California.

STATE RECORDS.—[At Lake Burford, in the spring of 1918, several were heard calling up to June 12, and one was flushed, so it is possible that one pair at least nested (Wetmore). On May 3, 1920, several were observed at marshes and lakes four miles north of Albuquerque. On September 3, 1920, they were found abundant in the same place and several were secured (Ligon).] Although there is no winter record for the Virginia Rail in New Mexico, it is probable that it occasionally remains there through the cold weather, as it is known to do in Colorado.

There are only a few migration records. One was seen near Albuquerque August 31, 1915 (Leopold), one near the head of the Rio Laguna August 26, 1850 (Woodhouse), one in the valley of the Pecos near latitude 32° (Pope), one heard on the Mescalero Indian Reservation September 11, 1902, and one found near the mouth of the Rio San Jose, a few miles above the town of Rio Puerco, September 7, 1905 (Hollister). In the spring of 1854, one was seen near Fort Thorn (Henry).—W. W. COOKE.

NEST.—In a grassy marsh, made of grass. *Eggs*: 7 to 12, buffy, sparingly and irregularly spotted with brown.

FOOD.—Aquatic insects, earthworms, caterpillars, locusts, grasshoppers, beetles, slugs, fresh water snails, small snakes and fishes, wild rice, seeds, and tender shoots of water plants.

GENERAL HABITS.—The curious barred-flank pattern characteristic of the various rails, is peculiarly "obliterative," as Abbott Thayer expresses it, for contrasted as it is with the gray or brown of the fore underparts, it destroys the figure of the bird, while carrying the eye to the background of light reeds and dark interspaces.

Both coloration and habit make the rails the most easily overlooked of birds, for much of their time is spent inside the sheltering cover of reeds or marsh grass, but perhaps for this very reason their call notes keep their relatives informed of their whereabouts. One of the calls of the Virginia Rail is given by Mr. Brewster as "a guttural *cut, cut, cutta-cutta-cutta*, repeated at brief intervals, often for hours in succession . . .

occasionally interrupted or closely followed by a rapid succession of low, yet penetrating grunts not unlike those of a hungry pig" (1902a, p. 47).

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 135, 292-301, 1926.—McLEAN, D. D., Condor, XVIII, 229, 1916 (nesting).

SORA: *Porzana carolina* (Linnaeus)

DESCRIPTION.—Length: 7.8-9.7 inches, wing 4.1-4.3, bill .7-.9, tarsus 1.2-1.3, middle toe 1.3-1.4. Bill short and compressed. Adults: Face and throat black; upperparts olive brown marked with black and lined with white; breast slaty, sides and flanks barred with white and blackish, iris brown or red; bill yellowish with dark tip; legs and feet yellowish green. Young in juvenal plumage: Color pattern of back and flanks similar, but no black on face and throat; no slaty on breast.



From Handbook
of Western Birds

FIG. 40. Sora
Rail

RANGE.—North and Middle America, the West Indies, and north-western South America. Breeds from British Columbia, Mackenzie, Manitoba, Ontario, Quebec, and Prince Edward Islands south to Pennsylvania, Illinois, Kansas, New Mexico (probably Arizona), Utah, Idaho, Nevada, and Lower California; winters from northern California, Arizona, Gulf States, and Bermuda south through West Indies and Central America to Venezuela, Colombia, Ecuador, and Peru.

STATE RECORDS.—Southern New Mexico seems to be the southern limit of the breeding range of the Sora or Carolina Rail, in the Rocky Mountain region, where it is fairly common in the few localities adapted to its needs. [It apparently nests at Lake Burford, and is rather abundant in marshes on the head of the East Gila River in Socorro County where the cowboys report finding young in abundance, when cutting hay in late summer. Several were seen February 22, 1915, in a marsh in Apache Canyon, Socorro County. They are also common in summer on the lakes and sloughs in the vicinity of San Acacia (1916-1918). Near Albuquerque, September 3, 1920, great numbers were found in marshes (Ligon). At Silver City a few are seen every spring in suitable places, and one was found dead (on Ninth Street) September 9, 1921 (Kellogg).] Two immature birds were found near Mesilla, one August 27, 1912, and the other a week later (Merrill); one heard at Beaver Lake, August 26, 1908 (Birdseye); and one flushed near Carlsbad, September 3, 1901; seen at Lake La Jara, September 17, 1904, and ten days later, on the tule-bordered lake at Lake Burford found common; still common near the big spring at San Rafael, October 26-31, 1908 (Bailey), and no doubt they linger still later in the southern part of New Mexico even if some do not occasionally remain there the entire winter.—W. W. COOKE.

NEST.—Usually on the ground, well concealed in tules or in clumps of marsh grass, the stems often bent over to form a canopy. Eggs: Generally 10 to 12, occasionally 16 to 18, buffy drab, spotted with reddish brown and purplish gray.

FOOD.—Seeds of wild rice, pondweed, and other aquatic plants; also snails and other small mollusks, crustaceans, aquatic insects, grasshoppers, and worms.

GENERAL HABITS.—Bearing in mind Abbott Thayer's suggestion that the markings of the Sora produce an obliterative water picture, it is interesting to study "what details and aspects of reed-swamp surfaces they most resemble." Near Albuquerque, Mr. Leopold found them breeding in cat-tail swamps and occasionally grassy irrigation ditches. Near Las Cruces, in June and July, Professor Merrill has seen

them "in wet fields where marsh grass, rushes, and cat-tails grew in abundance" (MS), and near Mesilla Park he has heard their calls from a larger tule-filled sink. At State College, strangely enough, he once picked up a young one that had killed itself by flying against a telephone wire (MS).

In walking through the smartweed patches bordering the tules of Lake Burford we frequently flushed the quaint Soras, when they slanted up with droll heavy-bodied, short-winged flight to speedily drop down, losing themselves among the myriad stems of their safe cover. When a gun was shot off near the tules where one was hidden, a shrill scream would announce its presence, and during the mornings the strident laugh was often heard mingled with the talk of coots and the quacking of ducks (1910c, p. 424).

Like the Virginia Rails, during the breeding season the Soras are so full of talk and song that they may easily keep track of each other in their labyrinthine marshes. Their commonest calls are a bright animated *kee*, or *ker-wee*, while the full song which Mr. Brewster attributes to the female and describes as "the silvery whinnying notes," suggests an ecstatic descending chromatic scale. Sometimes broken near the end, after a moment's pause the last notes are repeated, slowing up at the close.

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 135, 303-316, 1926.—FORBUSH, E. H., Educational Leaflet 75, Nat. Assoc. Audubon Soc.—RAY, M. S., Condor, XV, 112, 1913 (nest).

COOTS: Subfamily Fulicinae

AMERICAN COOT: *Fúlica americana* Gmelin

DESCRIPTION.—*Length*: 13-16 inches, wing 7.2-7.6, bill (to front of shield) 1.2-1.6, tarsus 2-2.2, middle toe 2.4-2.6. Toes with scalloped lobes for swimming, and under plumage dense. *Adults in summer: Plumage slaty*, darkening to black on head and neck; wings and under tail coverts marked with white, and feathers of belly more or less tipped with white; iris red, *bill mainly white*, frontal shield on forehead chocolate brown; legs and feet yellowish green, lobes gray. *Young in juvenal plumage*: Similar to adult but upperparts brown, underparts mottled, frontal shield rudimentary, iris brown.



FIG. 41. Foot of Coot

RANGE.—North and Middle America. Breeds from British Columbia, Mackenzie, Saskatchewan, Manitoba, Ontario, and Quebec south to Guatemala, Mexico, and southern Lower California (rare or accidental as a breeder in eastern United States); winters from British Columbia (probably Idaho and Nevada), Utah, Colorado, Texas, eastward to Maryland and south to Panama, Columbia, and Peru; casual in Labrador, Greenland, Alaska, etc.

STATE RECORDS.—The American Coot has a widely extended breeding range from central Canada to Yucatan and Guatemala. Its summer home in New Mexico is found both in the lowest altitudes as at Carlsbad, 3,000 feet (Bailey), and up to 8,000 feet at Halls Peak (Barber). It breeds near Santa Rosa (Bailey), Clark Lake near Carlsbad, Lakewood (Ligon), Mesilla (Merrill), Las Palomas (Goldman), and

undoubtedly at most of the favorable localities in northern New Mexico. It was very abundant on the Jicarilla Indian Reservation in 1913—at least 500 pairs were nesting at Lake Burford, many at Horse Lake and Dulce Lake and a few at Boulder Lake. While at Lake Burford, July 30, the young were nearly full grown, on August 10, nests with eggs were still common. [At Lake Burford they were still nesting very abundantly in 1916 (Ligon), and in May–June, 1918, came next to the Eared Grebe and Yellow-headed Blackbird in abundance, about 150 pairs nesting on the lake; sets of eggs were common after June 7 (Wetmore). On the Rio Grande Gun Club lake southwest of Albuquerque, many were seen June 16, 1919 (Ligon); June 8, 1920 (B. R. Britton). On May 3, 1920, 12 were seen at lakes 4 miles north of Albuquerque (Ligon).

They are abundant during migration wherever there are lakes (Ligon). Between Socorro and Albuquerque in 1917, on August 28, one was seen; September 4, 20 were seen; and they were also rather common in the vicinity of San Acacia (Ligon), where they were found wintering, January 11, 1919 (Leopold); Glorieta, common



MAP 9. AMERICAN COOT
Triangles mark breeding and breeding season records



Photograph by H. H. Pittman

AMERICAN COOT

The white bill effectively cuts the outline of the bird's head for unacquainted enemies, but is a helpful mark for knowing family and friends

August 12, 1920 (A. J. Kirn).] Many were seen September 9, 1903, on Black Lake, 8,400 feet, and as the conditions at this place are favorable for breeding, the species undoubtedly nests there (Bailey). In early October, 1908, they were very abundant on the small shallow reedy lakes along the top of the Chuska Mountains, at about 8,000 feet (Birdseye); a flock of 15 to 20 were on a reservoir near Koehler Junction, Colfax County, October 18-22, 1913 (Kalmbach); and a few were still present November 17-21, 1909, at Garfield (Goldman). They were seen occasionally on the Carlsbad Bird Reserve in January, 1915, and noted in December, 1916 (Willett). They are reported to remain through the winter on the lower Rio Grande near Fort Thorn (Henry), and at Mesilla (Merrill), and undoubtedly do so in small numbers at many places in the State as they do under similar conditions in the neighboring States.

In the spring migration on the Carlsbad Bird Reserve they were noted in 1914—in the third week in March, 1,000 or more were estimated (Cooper); a few nest; and at Chloride 15 were noted April 25, 1915 (Ligon).—W. W. COOKE.

NEST.—Generally among tules or sedges raised above water, woven of tules or sedge, sometimes with a tule gangway leading to the nest. *Eggs*: Usual normal sets 8 to 12, buffy, thickly, and evenly dotted with dark brown.

FOOD.—Omnivorous, feeds mostly extensively on tender aquatic vegetation, algae, wild celery, foxtail grass, wild rice, seeds, as pondweed, duckweed, and tule; but takes tadpoles, snails, and other small mollusks and water insects of many kinds, including water beetles; also dragon flies and grasshoppers and other foods found at hand. At Lake Burford in 1904, those seen out in the deep water were feeding on the black masses of pondweed, the gizzards of seven taken being filled mainly with its green stems, with the addition of tule seeds and sand.

GENERAL HABITS.—At the Burford Lakes in 1904 Coots were abundant both on deep water and in the tule shallows. Seven specimens, examined September 27, were still undergoing the fall molt. On one small lake edged with high black tules and yellowing green masses of the Olney bulrush, they were evidently on their breeding ground, the black spots scattered over its surface being of various sizes. Among them could be picked out white-cheeked Ruddy Ducks, Redheads, one or two grebes, and a few slender-necked phalaropes. The slaty oval bodies of the Coots might easily be overlooked were it not for their three distinct recognition marks, the white bills seen at a distance when they are swimming quietly on the surface making wedge-shaped waves behind them, the white wing markings caught when they rise laboriously, kicking the water foamy, and the white under-tail markings, which show as they swim away or when like little ducks they are standing on their bills with tails sticking up above the surface, marks that can be used effectively in leading broods through dark tule passageways. Recognition marks, however, seem superfluous when the loquacious birds are talking. Inside the high tule hedge bordering the smaller Lake Burford, where the families were seen, most remarkable noises were heard in passing—coughing sounds, frog-like plunks, and a rough sawing or filing *kuk-káwk-kuk*, *kuk-káwk-kuk* as of a dull saw that stuck—all the mixed medley in tones of good fellowship and fearless disregard of who

might be passing the other side of the tule screen—for who wanted Coots?

Here, too, Doctor Wetmore found small flocks of unmated birds feeding in the open bays or nesting in little bands on the open beaches until June 5, although they were already displaying and fighting savagely with one another. When these flocks broke up, each male selected a section of shore line in the tules, and remaining near it, guarded it jealously, taking frequent occasion to drive away ducks and Eared Grebes which might chance to trespass, and having many fights with neighboring males. In these encounters, Doctor Wetmore tells us, "they drove at each other with heads extended over the water and the wing tips elevated. When near they began striking viciously with their bills and then, lying back, struck heavily first with one large foot and then the other—a most effective means of fighting as their claws were long and sharp and their leg muscles powerful. Each tried to guard against these blows by seizing the feet of his antagonist, so that often the two held each other by means of their feet, while they thrust savagely with their bills. The females frequently took part in these squabbles also, so that sometimes three or four birds were engaged at one time, while neighboring males came rushing up, also seeming minded to interfere. When they separated the males sometimes rested for several minutes with heads down on the water and wing tips raised, eyeing each other like two game cocks." In the courtship display, "the male came paddling out with head and neck prostrate on the water, wing tips raised high above the tail, and the tail spread and elevated so that the white markings on either side were very prominent. As he came near, the female usually assumed the same attitude. When two or three feet away the male turned and presented the prominently marked tail to the female, swimming off slowly and then returning to repeat the performance. This action was seen constantly whenever Coots were under observation (1920a, 394–395). Still more striking testimony to the fact that, as Doctor Townsend states it, in display "the more brilliant or striking portions of the plumage are exposed to the utmost extent to the view of the courted one," has been obtained by him in the field. Apparently conscious that "both the white display of the under tail coverts and of the wings are best seen from behind," he says, "the pursuing male takes a short flight over the female, drops to the water beyond her and at once displays" (1925a, p. 6).

In building, a female watched by Doctor Wetmore arranged dead stems of the round-stalked *Scirpus occidentalis* to form a platform, bending them over and striking them repeatedly with her bill to make them stay in position, causing a peculiar knocking, hammering noise that at this season was to be heard in the rushes on all sides" (1920a, 394–395).

Droll, individual birds from the time they come out of the shell in black velvet with red sealing wax bill, bluish frontal patch, and red skull cap bordered with sparse yellow and black hairs, they are so easily watched that whoever will may study their life history and make, perchance, many an interesting discovery.

ADDITIONAL LITERATURE.—BAILEY, F. M., Condor, XXI, 4-6, 108-110, 159-162, 1919 (young).—BENT, A. C., U. S. Nat. Mus. Bull. 135, 358-371, 1926.—BRYANT, H. C., Condor, XVI, 225, 1914 (nests).

SHORE-BIRDS, GULLS, AUKS, etc.: Order Charadriiformes

The Shore-Birds, Gulls, etc., are mainly gregarious, nest mostly on the ground, and the sexes are alike in plumage. Many of the Shore-Birds perform extensive migrations, probably surpassing all others in the development of the migratory instinct, several of our species breeding on the Arctic islands and wintering on the plains of Patagonia (Eaton, 1909).

REFERENCES.—BREWSTER, WILLIAM, Bird Migration, Memoir Nuttall Orn. Club, No. 1, 1886; Bull. Mus. Comp. Zool., Harvard College, LXVI, 225-268, 1925.—CHAPMAN, F. M., The Travels of Birds, 1916.—COOKE, W. W., Yearbook U. S. Dept. Agr. Separate 642, 1914 (Shore-Birds); Bull. 35, Biol. Surv., U. S. Dept. Agr., 1910 (Shore-Bird distribution and migration); Bull. 185, U. S. Dept. Agr., 1915 (migration); Bull. 292, U. S. Dept. Agr. 1915.—CORY, C. B., How to Know the Shore-Birds, 1897.—DWIGHT, JONATHAN, The Gulls of the World, Bull. Amer. Mus. Nat. Hist., LII, art. 3, 63-401, 1925; Auk, XVII, 368-385, 1900 (molt of Shore-Birds).—JOB, H. K., Wild Wings, 203-255, 1905.—MCATEE, W. L., Circ. 79, Biol. Surv., U. S. Dept. Agr., 1911 (Shore-Birds).—SHUFELDT, R. W., Condor, XV, 138-151, 1913 (eggs).—TAVERNER, P. A., Birds of Western Canada, 127-128, 1926 (protection by Migratory Birds Convention Act).—THOMSON, A. L., Problems of Bird Migration, 1926.—WETMORE, ALEXANDER, U. S. Dept. Agr. Technical Bull. 26, 1927 (our Shore-Birds in S. America).

PLOVERS, etc.: Family Charadriidae

PLOVERS: Subfamily Charadriinae

The Plovers are characterized by large round heads, short thick necks, rather pigeon-shaped medium sized bills, long, pointed wings, middle and outer toes webbed at base and hind toe generally lacking. As usual with birds having conspicuous black and white "ruptive" coloration, they frequent not only shores but darker ground, and they also display the distinctive patterns of their wing linings by holding their wings raised a few moments on alighting. Strong winged, the Plovers perform extensive migrations, though not in such large flocks as the Sandpipers.

SNOWY PLOVER: *Charádrius nivósus* (Cassin)

DESCRIPTION.—Length: 6.2-7 inches, wing 4.2-4.3, bill about .6 (slender), tarsus .9-1. Hind toe absent. Chest band reduced to a short bar each side of chest, Adults in breeding plumage: Upperparts pale buffy gray, with black bars above

forehead, on ear patch, and side of chest; face, collar, bar on expanded wing, outer tail feathers, and underparts white; iris brown; bill blackish; feet dusky. Adults in winter plumage: Black replaced by dusky gray. Young in juvenal plumage: Similar to winter adults but with feathers of back tipped with white.

RANGE.—Breeds from California, Utah, and Kansas south to Texas, Lower California, and Peru; winters from Oregon and Texas to Venezuela, Brazil, and the Straits of Magellan; casual in Wyoming, etc.

STATE RECORDS.—Ten or twelve breeding birds were seen May 30, 1924, on the gypsum flats on Salt Creek about 3 miles west of the Pecos River and 18 miles north of Roswell. Although this is the first record for the State, others have been seen farther south, in western Texas, during migration (Ligon).

GENERAL HABITS.—In describing his encounter with Snowy Plover on the gypsum flat west of the Pecos, Mr. Ligon writes: "I first saw three of the birds flying together, whipping about near the surface over the flat at such swift speed that it was difficult to determine what they were although I could tell at a glance that they were unusual birds for that section. A few minutes later I saw a lone bird streaking away through the salt grass tussocks and into the open, stopping here and there for an instant; but as I followed it, it took to wing, leading a devious course, near the ground, and was soon out of sight. Further on several more were seen singly and in twos and threes about the shallow surface pools, and their conduct indicated clearly that they were breeding birds.

"The actions of these little deceivers were interesting and in some respects their conduct resembled that of nesting Killdeers. One would fly up near where I stood, alight and then streak away so swiftly as to leave one wondering whether it was on foot or wing. After going fifty or seventy-five yards, it would fall over on one side with the free wing extended and flop about on the ground as if seized by some agonizing affliction. When I crouched low on the ground the distressed little mite would again fly back within a few feet and nervously run back and forth; but when I would stand up, it would again shoot away like a rocket. Where the ground was more barren, others would run from one small object, such as a stick or tuft of grass, to another, conducting a skillfully executed hiding ruse before dashing off a little way to where the performance would be repeated.

"No nests or young birds were located, as my time was too limited to hunt carefully for them. The breeding area probably covers a square mile. There is always surface water on the flat, although it is very brackish" (MS).

On the coast of Peru, where Doctor Murphy found it a permanent resident, he found it difficult to see as it scurried over the white sand (1925, p. 281).

MOUNTAIN PLOVER: *Eupóda montána* (J. K. Townsend)

DESCRIPTION.—*Length:* 8-9.1 inches, wing 6, bill .8-.9, tarsus 1.5-1.6. Middle and inner toes without basal web, legs long. *Adults in breeding plumage:* Forehead and line over eye white, contrasting with black crown patch. Back of head and rest of upperparts plain light brown with buffy or rusty feather tippings; tail with blackish brown subterminal band and white tips; *axillars and wing linings white*, under surface of flight feathers *pale gray*; chest and sides pale brown, belly white. Iris brown, bill black, legs pale brown or yellowish, toes black. *Adults in winter plumage:* Without black or white markings, and plumage largely tinged with rusty or buff. *Young in juvenal plumage:* Like winter adults but light feather-edgings broader and brighter and under plumage more extensively tinged with tawny or creamy buff.

RANGE.—Breeds from northern Montana to western Nebraska, northwestern Texas and New Mexico; winters from north-central California, southern Arizona, and central Texas to southern Lower California and San Luis Potosi, Mexico. Accidental in Florida.

STATE RECORDS.—In June 27, 1874, downy young Mountain Plover were taken by Henshaw at Algodones and in June, 1864, Coues saw the birds a few miles farther south at Los Pinos. Even as late as 1898 they were said to be breeding still in eastern San Miguel County (Mitchell), where Henry had said they were common in 1855. [Between Domingo and Pena Blanca, Santa Fe County, a few pairs seemed to be nesting on the mesa (Jensen, 1922). A female with three young were seen, June 7, 1924, south of Kenna, Chaves County. No others were seen on a trip from Carlsbad to Cimarron.] They nest on open mesas north of Domingo, rather abundantly on the St. Augustine plain west of Magdalena, laying April 24, 1915, and in the rolling open country south of the Sacramento Mountains apparently nesting July, 1912; [nesting calls were also heard on the open flats west of the Rio Grande northwest of Taos in May, 1916; it was also "rather common over the long stretches of ridges and flats south of the Sacramento Mountains 50 to 60 miles southeast of Alamogordo," June 19, 1917 (Ligon); and in May a dozen or more were seen whipping about over the flat, in compact form, just west of Lulu (H. G. Smith). In the summer of 1926, when engaged in the New Mexico game survey, Ligon found them "fairly common in widely separated sections of the State." On May 19, a female and four young were seen 20 miles northeast of Tatum, Lea County; and on June 23, quite a number were seen between Tatum and Caprock. They were also found breeding quite commonly in the Animas Valley. They breed sparingly but practically all over New Mexico. The plains in the eastern part of the State and the San Augustine Plains, west of Magdalena, are two regular breeding areas. They also breed over limited areas in Torrance, Otero, Hidalgo, Santa Fe, Taos, and other counties.

The species occurs not rarely in New Mexico in migration. [On August 2, 1924, 25 were seen on the Ocean to Ocean Highway, St. Augustine Plain, 15 miles west of Magdalena. The same day 12 were seen about two miles to the southwest on high rolling hills along the Fair View road, and one two miles beyond. Some of these were birds of the year.] It was noted in the Jornada, September 1, 1905 Chloride, September 5, 1915 (Ligon); and Roswell September 11, 1902; was still present at Santa Rosa, September 27, 1902 (Gaut), and at Lake Burford, October 1, 1904 (Bailey). On the Carlsbad Bird Reserve it was reported as noted occasionally in fall (Willett, 1915).

Judged from the time of its arrival in central Colorado, the Mountain Plover probably enters New Mexico about the first of March, but as yet there are no actual spring records of the bird in the State, except that they were seen March 28, 1895, in the Datil Mountains (Herrick).—W. W. COOKE.

NEST.—In a slight depression lightly lined with dry rootlets and grass tops. *Eggs*: 3 to 4, ground color deep brownish drab, heavily spotted with blackish brown mixed with smaller and paler spots, somewhat confluent at the larger end.

FOOD.—Grasshoppers, locusts, crickets, beetles, flies, and other insects.

GENERAL HABITS.—Uniformity of coloration, absence of black bands, streaks, or patches, and its dry upland home distinguish this bird, for Doctor Coues points out, the name Mountain Plover is a misnomer, the birds living on the high arid plains. They spend most of their time on the ground, Mr. Cameron says, "where they run with incredible swiftness, fully twice as fast as a Killdeer. When disturbed they have a curious habit of collapsing, or shrinking into themselves, and stretching their bodies to the full height alternatively (1907, p. 255). When a brood of young were being photographed by Mr. E. R. Warren the mother tried various wounded birds' acts, one of which was to lie "flat on the ground with wings outspread and flutter them, and then flutter along the ground" (1912, p. 90).

A family that showed surprisingly little fear, perhaps because viewed from an automobile, was discovered by Mr. Ligon on the Roswell-Portales Highway. In driving along he caught sight of a Plover standing on a rock under a wire fence. The car was stopped and though it was backed up to a point even with the bird and only about forty feet from her, she quietly stood her ground. But a less courageous downy young stepped out from the shade of a nearby post—it was almost noon on a hot sunny day—as if starting to run away. Regaining its courage after a moment, it stepped back into the short narrow shadow, where two other downy young were discovered enjoying the relief from the hot sun. After a little the three quietly started out over the green grassy ground taking their time and stopping every few feet to look, as is the custom of the species. Even when Mr. Ligon got out of the car, the mother, though she left her rock, quietly made her way through the short weeds, led by the young. When she gave a low call they ran, scattering away to a safer distance. But on Mr. Ligon's return to the car, the mother began to quiet the young with her "notes of ease" and they soon gathered about her and all seemed content (MS).

ADDITIONAL LITERATURE.—BRADBURY, W. C., *Condor*, XX, 157-163, 1918 (nesting).

KILLDEER: *Oxyechus vociferus vociferus* (Linnaeus)

PLATE 24

DESCRIPTION.—*Length*: 10-11.2 inches, wing 6.2-6.7, tail 3.6-4.1, bill .7-.9, tarsus 1.4-1.5. *Hind toe absent*, toes not webbed at base; tail long for a plover. *Adults*: Upperparts mainly brown, lower back, rump and upper tail coverts conspicuous rusty or orange-brown; tail with black subterminal band and white tip; wing with conspicuous white bar in flight; forehead, eye stripe, collar, underparts, axillars and wing linings white; neck with two black bands, the wider one a complete collar; iris



From Biological Survey

THE VOCIFEROUS KILLDEER

The light reddish brown of the rump and tail show well in flight

brown; naked eye ring red; bill black; legs and feet variable, flesh color, yellowish, or clay color. *Young in juvenal plumage:* Like adults but duller, black bands narrower, feathers of upperparts margined with rusty or buffy.

RANGE.—Breeds from northwestern British Columbia, southern Mackenzie, northern Manitoba, central Quebec, and Labrador (two records) south to Gulf coast, central Mexico, and southern Lower California; winters from British Columbia, Colorado, Missouri, Indiana, and New Jersey south to Venezuela, Ecuador, and Peru.

STATE RECORDS.—One of the commonest and best known of the shore-birds, the Killdeer breeds throughout the whole of the lower parts of the State and even high up in the mountains: Carlsbad, 3,000 feet, 1899 (Bailey); Mesilla, 3,800 feet (Merrill); Hatchet Ranch, 5,000 feet, 1908 (Goldman); Silver City, 6,000 feet, 1894 (Fisher); Koehler Junction, about 6,000 feet (Kalmbach); Powderhorn Canyon on the Mimbres, 6,500 feet, 1906 (Bailey); Fort Wingate, 7,000 feet, 1905 (Hollister); Chloride, 7,500 feet, 1890 (Blinn); [at least to 7,500 feet in northern Santa Fe County (Jensen, 1923)]; and Agua Fria Spring, 8,000 feet, 1905 (Hollister). [At Raton, June 25-28, 1916, four pairs were breeding on 160 acres (Howarth). Very young birds were found on the East Gila River, at 6,200 feet, April 23, 1916, and on high open pine country at 8,500 feet, near Mount Taylor a nest, was found June 22, 1916, containing three fresh eggs (Ligon). At Lake Burford, May-June, 1918, two pairs nested (Wetmore); in the Pecos Valley June 16-21, 1918, at nearly every well with a dirt tank one or more pairs were nesting; along the Pecos River they were present in numbers, and apparently most of them bred, young of various sizes being seen; and at the Rio Grande Gun Club Lake, southwest of Albuquerque they were common, with young, June 16, 1919. Young were seen, May 9, 1920, at San Simon, Hidalgo County, and the birds were common from Silver City to the Mexican line, as they were from Carlsbad to Cimarron May 27-June 22, 1924]. Eggs have been taken in the Animas Valley, June 1, 1892 (Mearns), and at San Mateo, July 6, 1873 (Henshaw), while young had just hatched May 8, 1913, at Palomas Springs. Several were seen on the Mayberry Ranch, about 60 miles west of Magdalena, April 26, 1915 (Ligon).

In migration the Killdeer seems to range considerably higher than its breeding grounds since it was seen on the summit of Costilla Pass, 10,100 feet in late September, 1903 (Howell), and was found up to 11,000 feet in San Miguel County (Mitchell). In Union County, it was abundant at Clayton, October 22, 1893 (Seton).

There are comparatively few records of the Killdeer in New Mexico during the middle of winter, but one was observed on the Tularosa River, 7 miles southwest of Aragon, Socorro County, at 7,000 feet, December 14, 1914; a few were seen in a marsh in Apache Canyon, February 22, 1915 (Ligon); [some stay throughout the year at Albuquerque (Leopold, 1919)]; some also remain in the southern part of the State as they do in localities of similar climate both east and west of New Mexico. They are common during October and early November, and as late as December 1, 1902, they were still common at Tularosa (Gaut). Quite a number remained through the winter of 1912-13 along the Alamosa and Gila Rivers in Socorro and Sierra Counties; they winter as far north as old Ojo Caliente, north of Monticello; and on December 22, 1915, perhaps 20 birds were seen in the canyon along Cuchillo Creek—generally two in a place (Ligon); and a few sometimes winter near Mesilla (Merrill).

Spring migration begins so early that by the middle of March the species has already reached northern New Mexico: Fort Wingate March 10, 1885; Agua de Lobo, Taos County, March 11, 1888 (Washburn); Halls Peak, March 16, 1895 (Barber); and Las Vegas, March 22, 1902 (Atkins). At Chloride, they were noted

March 18 and 20, 1915 (Ligon); on the Carlsbad Bird Reserve about 200 were estimated April 27, 1914, and 100, April 29 (Cooper); they were common in January, 1915, noted during the winter of 1915-16, [common in December, 1916, and also on the Rio Grande Bird Reserve noted November 23-December 9, 1916 (Willett)].—W. W. COOKE.



MAP 10. KILLDEER

Triangles mark breeding and breeding season records

NEST.—A slight depression in bare sandy or pebbly ground with or without lining of grass, weed stalks, pebbles, or bits of hard earth. **Eggs:** Usually 4, dull buffy, boldly marked with dark brown, black, and dull lavender.

Food.—Weed seeds and a remarkable array of injurious insects, as mosquitoes, the cattle fever tick of Texas fever fame, crane flies (leather jackets) destructive to wheat and grass, grasshoppers, caterpillars, including cutworms, the clover-root, clover-leaf, and cow pea curculio, various weevils which attack cotton, grapes, and sugar beets, and especially the alfalfa weevil of which it is one of the most effective destroyers; bill bugs which damage corn, wire worms and their adult

forms, the click beetles, the southern corn-leaf beetle; horse flies, diving beetles injurious in fish hatcheries, marine worms that prey upon oysters, and crawfish. It is the most beneficial of our shore-birds.

GENERAL HABITS.—Any one who has hunted for a Killdeer's nest in a young corn field or potato patch and watched the troubled parent crouch, run, squat as if on eggs, and rise only to crouch and run again, will readily agree with Abbott Thayer's statement that a bird can be concealed on such ground merely by counter-shading and color. Its conspicuously colored tail may well mislead the enemy by its sudden disappearance on squatting, while when spread, it may help the mate and young to keep their direction in following behind. Corn fields, potato patches, wheat fields, and similar places around ranches seem to be favorite resorts of the Killdeer, for here they can find both food and water, and a certain amount of protection. In the Pecos Valley, Mr. Ligon reports, they are very common and nest where they find sufficient water to "hold out until the young can be reared to a point where they can travel" (MS).

When watching a Killdeer's nest, Mr. Warren found that the parents carried every bit of shell away within two hours after the hatching. The beautiful little striped nestlings, he says, become very quick and active almost as soon as they are dry, running with surprising speed. Their notes are small counterparts of those of their parents.

Though they are never so gregarious as other shore-birds at Mesilla Park, Professor Merrill found them abundant all over the valley, wherever there was any water in river, pond, lake, roadside pool, irrigated fields, or water tanks in corrals. Here as elsewhere, he says, "the Killdeer is very tame, curious, and querulous, and greatly given to expressing its disapproval of one's presence on its feeding or breeding grounds by an oft repeated peevish '*pe-ep*.' When the cold weather comes in December," he adds, "most of the birds go, but a few individuals may infrequently be seen in the winter. In the fall, they come up on the mesa to feed more than at any other time" (MS).

The Killdeer is so commonly associated with fields and roadsides that it is especially interesting to hear from Mr. Clarence Cottam of its being found swimming, apparently quite at home, on the wide, swift-flowing Green River of Utah (1928, pp. 207-208).

The pleasant cry of *kill-dee, kill-dee* is so familiar that it is recognized when heard during migration on moonlight nights as well as in daylight when the notes come from high in the sky before the travelers become visible.

ADDITIONAL LITERATURE.—BAILEY, G. A., *Bird-Lore*, XXIII, 233-238, 1921; XXIV, 323-327, 1922 (bird photography).—CHADBOURNE, A. P., *Auk*, VI, 255-263, 1889.—DUTCHER, WILLIAM, Educational Leaflet 23, Nat. Assoc. Audubon Soc.—GRINNELL, BRYANT, and STORER, *Game Birds of California*, 463-469, 1918.—

HUXLEY, J. S., Auk, XXXIII, 263-264, 1916.—ROCKWELL, R. B., Condor, XIV, 128-131, 1912.—THAYER, G. H., Concealing-Coloration in the Animal Kingdom, Figs. 70-72, 1909.

AMERICAN BLACK-BELLIED PLOVER: *Squatárola squatárola* (Linnaeus)

DESCRIPTION.—*Length:* 10.5-12 inches, wing 7.5, bill 1.1, tarsus 1.9. Bill short, stout, deep at base, *head and eye large*; front toes webbed at base, *hind toe present* but minute. *Adults in breeding plumage* (sexes alike or similar):



From Biological Survey

FIG. 42. Black-bellied Plover

At a distance, the black of the color pattern (secant coloration) is protective, cutting in two the rounded form of the bird

on lower underparts, chest tinged with brownish gray; upperparts without black spotting; rump, tail coverts, tail, and axillars as in summer. *Young in juvenal plumage:* Like winter adults, but upperparts dark brown spotted with white and buffy, upper tail coverts tipped with it and tail with slight buffy tinge; breast and sides dingy or buffy white. Feet lead color.

REMARKS.—The winter adults may be known by their big heads, short plover bill, short white band on wing, black axillars, whitish tail coverts, and partly barred white tail.

RANGE.—Circumpolar. Breeds on Arctic coast; in America, winters from California, Louisiana, and North Carolina to Brazil and Peru.

STATE RECORDS.—During migration the Black-bellied Plover is known throughout nearly the whole of the United States, hence it is probably more common in New Mexico than the two records for the State would indicate. Two were seen in late March, 1886, near Apache (Anthony), and one taken October 26, 1898, at Thirteen Mile Lake, Chavez County (Barber).—W. W. COOKE.

FOOD.—Cutworm larvae, earthworms, marine worms, grasshoppers, locusts, beetles, and other insects, grubs, spiders, minute shellfish, water snails, crabs; and also berries.

GENERAL HABITS.—The Black-bellied Plover in its black and white summer plumage is a striking example of what Abbott Thayer calls "ruptive markings, bold massed patterns of contrasting shades and colors," which destroy the bird's contour in an open landscape (1909, p. 79). That it nests in the open, in one instance in *black moss*, is

¹ A male taken September 16 was still in almost complete nuptial plumage.

suggestive (A. M. Bailey, 1926, p. 84). In the non-committal winter plumage of the Black-bellied, the black axillars may well help migrating flocks to keep together, for, as Grinnell, Bryant, and Storer note, in flight its wing beats "seem to cover an arc of almost 180 degrees so that the black axillars are prominently displayed at each up-stroke." As Ernest Thompson Seton says, "all bird students will recall the pretty way in which most of the plovers let the world know who they are. As soon as they alight, they stand for a moment with both wings raised straight up to display the beautiful pattern on the wing linings; a pattern that is quite different in each kind and that is like the national flag of the species, for it lets friend and foe alike know what species is displaying it" (1901, p. 187).

Feeding at low tide on the mud flats and sandy beaches, at high tide it usually retires to the higher drier portions of the shoals and marshes. On Hoonah Sound, in southeastern Alaska, Mr. Alfred M. Bailey was fortunate enough to have several of the interesting birds close at hand on the bar in front of his camp during his entire stay, from May 7-24. "They were very tame and rarely flew any distance when they were flushed" (1927, p. 195).

On their autumnal migrations, Mr. Brewster said, their "far-reaching, musically-plaintive calls" may be heard in the early morning or late evening, if not also in the night (1924-1925, pp. 268-269). "Coming singly or in couples as a rule, and rarely if ever more than three or four together or in the same neighborhood . . . some tarry for but a single day, before passing farther southward; others remain over several successive days and nights, if not molested by gunners."

ADDITIONAL LITERATURE.—NICHOLS, J. T., and F. HARPER, *Auk*, XXXIII, 251-252, 1916.

SNIPES, SANDPIPERS, etc.: Family Scolopaciidae

The Snipes and Sandpipers form one of the largest families of shore-birds. They are of medium size, the bill is generally long, and characteristically slender, grooved and in some, sensitive, serving as both probe and forceps in the soft mud where they secure their food. They have long legs, short toes, long pointed wings, and short tails. The sexes and young are generally similar, but seasonal plumages differ to correspond with differences in habit, for many of the birds that resort to the beaches in winter retire to the protection of weeds and grasses during the nesting season and accordingly have a more grass-like pattern in summer. Their patterns are simple, highly generalized, and varying little among the species. Many of the beach birds have faint picture patterns—delicate and linear and wavy (Thayer, 1909). They live mainly along shores, mud flats, or open marshes, feeding principally on mollusks, crustaceans, and insects. They are the most important bird

enemies of mosquitoes, and feed upon many of the worst enemies of agriculture. "So great is their economic value that their retention in the game list and their destruction by sportsmen is a serious loss to agriculture" (McAtee, 1911a).

SNIPES: Subfamily Scolopacinae

WILSON SNIFE: *Capélla delicáta* (Ord)

DESCRIPTION.—*Length:* 10.5–11.1 inches, wing 4.9–5.6, bill 2.5–2.7, tarsus 1.2–1.3, middle toe 1.1–1.3. Bill widened and sensitive at tip, tip of upper mandible over-reaching the lower. *Adults and young in first winter plumage:* Top of head



From Western Handbook

FIG. 43. Wilson Snipe

with narrow buffy or whitish median stripe between broad black lateral stripes, bordered by pale supercilary stripes above dark eye stripes; *upper parts variegated, dark brown, black, tan or buffy striped with light buffy or whitish, giving a lengthwise striped pattern to head and back;* upper tail coverts dusky, central tail feathers black with broad subterminal rufous bar and whitish tip; neck and breast streaked and spotted; *belly white;* under tail coverts buff, marked with blackish V's; axillars and wing linings barred black and white; iris brown, bill greenish gray, blackish toward tip, legs and feet greenish gray. *Young in juvenal plumage:* Similar

to adult but with considerable admixture of cinnamon.

RANGE.—North America and northern South America. Breeds from north-western Alaska, northern parts of Yukon, Mackenzie, Manitoba, Quebec, and New Brunswick to Newfoundland and south to New Jersey (rarely), Illinois, South Dakota, southern Colorado, northern Nevada, southern and probably Lower California; winters from southern interior of British Columbia, Montana, Colorado, Arkansas, and North Carolina south through Central America and West Indies to Colombia, Peru, and southern Brazil (winters casually and locally north to Washington, Oregon, Nebraska, Minnesota, and Nova Scotia).

STATE RECORDS.—Found breeding in 1875 by Aiken at the San Luis Lakes, Colorado, it is possible that occasionally a pair of Wilson Snipe remain in northern New Mexico, but up to the present time the species is known in the State only as a migrant and as a rare winter resident. The first was seen August 11, 1913, at Lake Burford (Ligon); [several were seen near Albuquerque, August 18, 1918 (Leopold), and three seen, September 3, 1920, at lakes 4 miles north of Albuquerque (Ligon)], and by September 3, 1901, it was already common near Carlsbad (Bailey); it was noted September 17–26, 1904, at the La Jara and Burford Lakes where one was taken September 17 that had completed its molt (Gaut). It was noted September 27–October 5, 1902, near Santa Rosa, and September 27, 1905, up to 8,000 feet in the Bear Spring Mountains (Hollister); October 4 and 12, 1913, near Koehler Junction, (Kalmbach); October 6, 1908, two at a small shallow lake in the Chuska Mountains at about 9,000 feet; and November 12, 1908, three near Farmington (Birdseye); November 25, 1893, one seen at Pinabettitos Creek, west of Clapham (Seton); December 11, 1899, one was noted at Socorro (Merrill), and a pair December 30, 1893–January 9, 1894, at a spring hole near the river at Espanola (Loring). These, of course, were wintering, and a few are said to have wintered on the Rio Mimbres (Henry). The species was observed throughout the winter of 1912–13 on Alamosa River in Sierra County, and on Beaver Creek in the Gila Forest Reserve;

and on December 22, 1915, was seen on Cuchillo Creek (Ligon); it was seen occasionally on the Carlsbad Bird Reserve in January, 1915 (Willett). [It also winters at Albuquerque (Leopold, 1919).]

In the spring migration it was noted on the Mimbres in March, 1913 (Rockhill); at Chloride April, 1912, and April 25, 1915; at Mayberry Lake about 60 miles west of Magdalena on April 26, 1913; and one seen May 6, 1913, at Palomas Springs (Ligon). [It has also been noted, April 15, 1923, 20 miles east of Silver City (Kellogg)].—W. W. COOKE.

NEST.—A depression in grass or moss in partly moist ground, sometimes in the center of a tussock. *Eggs*: 3 to 4, olive, clay color or brownish ashy, heavily marked with chocolate, chiefly around the larger end, and usually also with sharp scratchy lines.

FOOD.—Largely worms, larvae of flies, dragon flies, and other insects; small caterpillars, ants, black crickets, locusts, grasshoppers, mosquitoes, crane flies, spiders, the predaceous diving beetles that make trouble in fish hatcheries; snails, shrimps, crawfish, univalves; seeds and the slender roots of aquatic plants.

GENERAL HABITS.—The Jack Snipe is a bird of fresh-water swamps and meadows and their weedy or bushy borders, among whose sticks and grasses, as Abbott Thayer points out, his striped and mottled form is obliterated by counter-shading and a picture pattern of sticks and grasses and their shadows.

Here he walks easily about, as Mr. Eaton describes it, "thrusting and probing in the soft oozy soil for worms, grubs, soft roots, and seeds, which constitute his favorite food. When his foes appear he crouches so motionless that it is impossible to distinguish him among the grasses, and when too closely pressed springs suddenly into the air with a sharp grating call and makes rapidly off in a 'rail-fence' course not far above the ground until well out of danger, when he mounts high in the air and circles about for a few minutes finally to pitch headlong again" (1909, p. 302). The probings of the Jack Snipe make the ground look in places as if "drilled with holes." They are so characteristic that hunters do not look for Snipe except where the probings are found. When walking about the borders of pools in plain sight, Doctor Wetmore says, "their short legs, long bills and heavy bodies give them a somewhat grotesque appearance" (1927b, p. 358).

One of the birds that we flushed near Carlsbad rose with its explosive *zeep-zeep-zeep* and dropped into a field across the fence. Another that we flushed from under the weeds in a prairie-dog field went whizzing over to a bare spot by an irrigation ditch where it was so nearly the color of the ground that it looked like a dark brown ball and we had to walk near to make out the long bill that restored the bird form.

An autumn whistling note of the Wilson Snipe, delivered high in the sky, has been described by Mr. Aldo Leopold as consisting of "six or seven mellow whistling notes, all run together, each of the same low pitch," suggesting "one of the Loon's calls heard at a distance" (1927, p. 79).

The aerial performance, analogous to that of the Woodcock, is characteristic of the Jack Snipe in the breeding season. Sometimes he makes a sudden descent of five or six hundred feet, after circling high in the air with a "quivering motion of the wings" and what Mr. Eaton describes as "a weird tremulous crescendo whistle, resembling somewhat the distant or muffled bleating of a kid, or the sound of an old fashioned fan-mill, whence the notes have been known as the 'bleating' or 'winnowing' of the Snipe" (1909, pp. 302).

ADDITIONAL LITERATURE.—BREWSTER, WILLIAM, Bull. Museum Comp. Zool., Harvard College, LXVI, 232-240, 1925.—GRINNELL, JOSEPH, Pacific Coast Avifauna, No. 1, 22, 1900.—GRINNELL, BRYANT, and STORER, Game Birds of California, 350-358, 1918.—HOFFMAN, RALPH, Condor, XXVI, 175-176, 1924.—ROCKWELL, R. B., Condor, XIV, 125-126, 1912 (nest).—SAUNDERS, A. A., Condor, XII, 197, 1910 (nest).—SUTTON, G. M., Wilson Bulletin, XXXV, 191-202, 1923 (nesting).—THAYER, G. H., Concealing-Coloration in the Animal Kingdom, pp. 33-34, Figs. 25-26, 1909.

CURLEWS, etc.: Subfamily Numeniinae

LONG-BILLED CURLEW: *Numenius americanus americanus* Bechstein

PLATE 25

DESCRIPTION.—Size large. *Length*: About 20-26 inches, wing 10-11, bill (in old birds) 8.5, tarsus 3-3.5. Bill slender and downcurved, upper mandible longer than lower; front toes webbed toward base. *Adults in breeding plumage*: General color "varying in intensity in individuals," pinkish cinnamon, except chin and throat which are much lighter; top of head streaked with black, back and shoulders, streaked and barred with dusky, in coarse "herring-bone" pattern; rump dusky, spotted with cinnamon; upper tail coverts and tail barred; wings largely barred; axillars and under wing coverts deep pinkish cinnamon sometimes immaculate, sometimes sparsely barred (Ridgway); neck and chest streaked, belly plain cinnamon, sides and flanks sparsely and narrowly barred; iris brown, bill dusky, paling to flesh-color at base of lower mandible, legs and feet bluish gray. *Adults in winter plumage*: Similar to summer adults, but general coloration deeper pinkish vinaceous, especially on underparts. *Young in juvenal plumage*: Similar to adult except in measurements; "distinguishable only by soft juvenal character of plumage" (Forbush).

COMPARISONS.—Plain or sparsely barred, pinkish axillars distinguish the Long-billed from all the other Curlews; saw-toothed markings on the wing quills distinguish it from the Eskimo; and an evenly striped crown, from the Hudsonian. (See p. 261.)

RANGE.—Breeds from semi-arid interior of British Columbia, southern Alberta, and southern Manitoba south to northwestern Texas, northern New Mexico and northeastern California; winters from central California and southern Arizona south to Yucatan, Guatemala, Oaxaca, and Lower California; also on South Atlantic and Gulf coasts.

STATE RECORDS.—The breeding range of the Long-billed Curlew extends south into northern New Mexico on the plains and in the lower valleys. [It breeds from Roswell northward and west to Vaughn, Wagonmound and Springer, but most commonly east of Vaughn, south of Clayton and in the Ute Creek Valley, east of Roy (Ligon, 1927).] Specimens have been taken in Colfax County (Charles Springer). Some were taken at Raton May 10, 1901. Near Montoya a pair with half-grown



From Handbook of Birds of the Western United States

LONG-BILLED CURLEW

In preening it shows the curious herring-bone pattern of the feathers

young were seen on the plain, June 20, 1903. Birds apparently nesting had been seen a few days earlier near Santa Rosa (Bailey); also 35 miles south of Fort Sumner June 30, 1913, and near Fort Sumner July 1 (Ligon). The occurrence of the species at Fort Wingate, July 8, 1892, probably indicates its breeding at that point (Fisher); a specimen was taken June 20, 1898, at Mesilla (Barber); and eggs were collected at Los Pinos about June 22, 1864 (Coues), though it is "rarely observed west of the Pecos" (Ligon). In the Fort Sumner section of the Pecos Valley one pair was reported in 1913. [In June, 1918, several pairs were seen at various points in a region 20 miles south and west of Fort Sumner, and they were reported commonly by the people. A nest was found near the Pecos early in June, 1918 (Ligon). Near the Pecos, north of Santa Rosa, a nest was reported to Mr. Ligon by Mr. P. Bright in 1918. In the spring of 1919, great numbers of curlews of undetermined species were found in eastern New Mexico (Ligon). They were common over all the open country of the northeastern part of the State; numbers were seen in the Tequesquite Valley between Albert and Gallegos, May 16, 17, and 18; and near David flocks of 8 and 10 besides lone birds were seen (Piper). More were seen in the vicinity of Vaughn than for years, and 15 miles east of Vaughn on May 13, 1919, a nest with four nearly fresh eggs was seen, and several pairs of the birds observed (E. F. Pope). On May 29 and 30, 1924, about 7 miles southeast of Vaughn, a nest was found. None of the birds were met with in the Lower Pecos Valley or on the Lower Staked Plains south of Portales, but ranchers stated that they were quite common in some parts of the district. North of Nara Visa as far as Clayton they were often seen, practically all breeding birds. However, they were most abundant in the wide valley of Tequesquite Creek, about Albert in Harding County. While none were observed west of this valley it is known that they nest rather freely in some seasons in San Miguel County (Ligon).]

During the fall migration one of the two forms, *americanus* or *occidentalis*, which one, is as yet undetermined, is common over much of the lower part of New Mexico where neither occurs in the breeding season, and other undetermined birds have been noted in spring and fall migrations in various parts of New Mexico. An unusually early migrant was taken July 14, 1892, at Cloverdale (Mearns), and curlews range in the fall at least to 7,000 feet, at which altitude they were noted August 28, 1845, on the headwaters of the Canadian River (Abert). In August, 1911, they were noted on the Carlsbad Bird Reserve (Ligon). On August 25, 1913, a flock of about 100 was seen on the Maxwell Reservoir in Colfax County (Kalmbach); [on August 22-28, 1926, a small flock was seen on the lakes near Socorro (B. R. Britton)]. The height of fall migration is during September, but the birds remain common much later: in the Jornada, October 5, 1905 (Ligon); and Santa Rosa, November (Gaut).

Winter birds were occasionally seen on the Carlsbad Reserve in January, 1915 (Willett).

Spring arrivals were noted on the New Mexico-Chihuahua line 60 miles west of El Paso, March 22, 1892 (Mearns), at Apache, March 25, 1886 (Anthony); [at Deming one was taken March 26, 1921, from a flock of about 100, and on the Rio Mimbres two were seen April 7, 1927 (Kellogg)]; in 1915 one was seen on the Tularosa River, 5 miles southeast of Aragon, April 10; a flock heard passing over the Cuchillo Mountains, 16 miles northeast of Fair View, April 18; and one seen flying about Mayberry Lake, at the west end of the San Augustine Plains, April 25 (Ligon); about 300 were estimated on the Carlsbad Bird Reserve, March 26, 1914 (Cooper). It was noted near Fort Wingate, April 8, 1909 (Peterson).—W. W. COOKE.

NEST.—A slight hollow in the ground lined with grasses and weeds. Eggs: 3 to 4, olive clay-color or brownish ashy, superficially spotted or blotched with chocolate and blackish, with deeper-lying markings.

FOOD.—Chiefly grasshoppers but also beetles and grubs, worms, spiders, flies, crickets, and other insects and their larvae; snails, small crabs, crawfish, shrimps, toads, and wild berries and seeds.

GENERAL HABITS.—On the Bolles Ranch near Carlsbad in the fall migration of 1901 we saw a flock of forty-four Curlews, of whichever form, swinging around over the irrigated fields and coming down to them; and in another place saw half a dozen in a large flock of Yellow-legs, the great, round-backed Curlews, their long bills extended before them, walking around with dignified demeanor in the midst of the restless, ever-shifting, head-bobbing throng of smaller birds. In one place a bathing Yellow-legs splashing with gusto apparently splattered a Curlew, for the big fellow made a disapproving pass at him with his long bill. When a Falcon appeared in the sky, eight Curlews and hundreds of Yellow-legs rose, the Curlews uttering stirring clarion calls as they flew. After circling back, on alighting, they raised their wings straight over their backs with beautiful effect (1910a, p. 162).

Farther north in the Pecos Valley, where in dry sections the great birds come to wells for water, Mr. Ligon was told of a nest of the Long-billed Curlew found by a Mexican sheep-herder on a flat near the river, with four brownish eggs "fully as large as those of a guinea." Though seeing the birds familiarly, the people of the region apparently were not molesting them (MS). A nest found by another sheep-herder in Guadalupe County, Mr. Pope says, was three hundred yards from a small water hole. Their selection of a breeding ground, Mr. Ligon finds, is affected by the condition of the range forage in spring. "If a former breeding range is dry, the birds are apt to shift to areas where vegetation is green" (1927, p. 149).

Near Montoya a pair of the Long-bills with half grown young were discovered as we drove over the plains June 20, 1903. The old birds made a great outcry, circling around us and flying low ahead of our horseman, while the whitish, downy young vanished—big as they were—so completely that we were unable to find them, though we hunted carefully for some time, and the only vegetation on the plain was the low yellow snake weed (*Gutierrezia*) and the short soapweed (*Yucca glauca*). Two other pairs were seen the same afternoon. On July 2, our camp man saw two or three pairs trying to drive away a lobo from their nesting grounds. They flew at him until they drove him off, when they turned their attention to the wagon coming down the road.

A Curlew was once seen by Mr. Bent feigning lameness to lead a coyote away, "flopping along on the ground a few yards ahead of him, but always managing barely to escape him" (1907, p. 427).

ADDITIONAL LITERATURE.—GRINNELL, BRYANT, and STORER, Game Birds of California, 438-445, 1918.—SILLOWAY, P. M., Condor, II, 79-82, 1900; XI, 86-88, 1909 (nest).—THAYER, G. H., Concealing-Coloration in the Animal Kingdom, Fig. 76, 1909.

CANADIAN CURLEW: *Numenius americanus occidentalis* Woodhouse

DESCRIPTION.—Like the Long-billed Curlew but smaller and bill much shorter. Length: About 19.2 inches; wing 10.2; bill 4.1.

RANGE.—Breeds from southern British Columbia, southern Alberta, and southern, Manitoba south to northeastern South Dakota, central Wyoming, northern Idaho and northeastern California. Winters from central California, southern Arizona, southern Texas, Florida, and Georgia south to San Luis Potosi and Jalisco, Mexico, and southern Lower California. Migrates west to western Washington and western California, and east to Iowa, etc.

STATE RECORDS.—Near Albuquerque on August 20, 1851, Woodhouse took the specimen which he later made the type of his new species *occidentalis*.¹ Specimens were also taken ten miles northwest of the Capitan Mountains, August 28, 1903, and at the Mexican Boundary Line, Long. 30° 15', near Emory Monument 5, March 22, 1892.

HUDSONIAN CURLEW: *Numenius hudsonicus* Latham

DESCRIPTION.—Male: Length: 16.5-18 inches, wing 9-10.2, bill 3-4, tarsus 2.2-2.3. Female larger than male. Smaller than the Long-billed, with (usually) shorter bill. Adults in breeding plumage: Variable; head striped, rest of upperparts grayish brown, mixed with buffy to whitish; tail and wings marked with pinkish or cinnamon, primaries barred, axillars pinkish buff, obliquely barred with grayish brown, wing linings spotted or barred; underparts buffy or whitish streaked with grayish brown, flanks tinged with cinnamon and barred or spotted; iris brown, bill blackish, lighter at base; legs and feet bluish gray. Young in juvenal plumage: Similar to adults but upperparts lighter, light spots larger, underparts pinkish buff.

RANGE.—Breeds from Kotzebue Sound to mouth of Yukon, Alaska, and on coast of northern Mackenzie; winters from Lower California to southern Honduras and Guatemala, in Lesser Antilles, from Ecuador and Peru to southern Chile, and from British Guiana to mouth of Amazon; migrates mainly along coasts; casual on Pribilof Islands.

STATE RECORDS.—The Hudsonian Curlew is rare in the interior of North America since its main routes of migration are along the Atlantic and Pacific coasts in passing from the Arctic breeding grounds to Middle and South America. Occasionally a few cross the plains east of the Rocky Mountains and one of these was taken at Fort Thorn, April, 1854 (Henry)—the only record for New Mexico.—W. W. COOKE.

ADDITIONAL LITERATURE.—BENT, A. C., Educational Leaflet 62, Nat. Assoc. Audubon Soc.—FORBUSH, E. H., Birds of Massachusetts, I, 453-459, Plate 29 (diagrams of wing patterns).

[ESKIMO CURLEW: *Phaéopus borealis* (J. R. Forster)]

DESCRIPTION.—Length: 12.6-14.5 inches, wing 8-8.5, bill 2.2-2.5, tarsus 1.7-1.8. Like the Hudsonian Curlew but smaller, with slenderer bill; top of head sooty black, more or less streaked with pale buffy, especially along median line; primaries unbarred.

¹ Woodhouse, S. W., Description of a New Species of *Numenius* (Moehr), Proc. Acad. Nat. Sci. Philadelphia, 194-195, 1852.

RANGE.—Formerly bred on barren grounds of North and Northwest, chiefly in northwestern Alaska and northern Mackenzie; wintered on the plains of South America, chiefly in Argentina, but south to the Straits of Magellan; now nearly or quite extinct [none were observed in South America in 1920 and 1921 (Wetmore)].

STATE RECORDS.—At the present time the Eskimo Curlew is probably the rarest bird in the Western Hemisphere and its extinction seems imminent. When it was abundant fifty years ago it went south in the fall across the Atlantic Ocean and on its return traversed the prairies of Texas, Kansas, and South Dakota on its way to the Arctic Coast. It never passed regularly west of Kansas and there is no sure record for either New Mexico or Colorado, but the straggler collected by Dr. Mearns April 8, 1892, at Lake Palomas on the New Mexico-Chihuahua line would undoubtedly have crossed both these States within the next few days.—W. W. COOKE.]

UPLAND PLOVER: *Bartrámia longicauda* (Bechstein)

PLATE 26

DESCRIPTION.—*Length:* 11–12.7 inches, wing 6.5–7, bill 1.1–1.1, tarsus 1.9–2. Head small, neck and legs long, tail graduated, reaching beyond tips of folded wings, outer and middle toes webbed at base. *Adults in breeding plumage:* Crown blackish, with median buffy lines, rest of upperparts dusky, scalloped and streaked with buffy brown, tending to black barring on wings and tail; rump blackish, outside feathers marked with white; tail mainly dull buff broadly tipped with white and crossed by irregular bars of black; outside wing quill with saw-toothed markings; axillars and wing linings white, sharply barred with dark brown; sides of head and neck, foreneck and upperbreast buff, narrowly streaked with black; broad streak over eye, white or pale buffy; part of breast, sides and flanks buff, sharply barred with dark brown; chin and belly white; iris dark brown or blackish; bill yellow, with black ridge and tip; legs and feet dull greenish yellow. *Adults in winter plumage:* Similar to summer adults but paler. *Young in juvenal plumage:* Like adults but buff of head, throat and wings replaced by pinkish cinnamon, back black, feathers bordered with pinkish buff or white, giving scaled effect.

RANGE.—Mainly plains and prairie region of Rocky Mountains. Breeds from northwestern Alaska, southern Mackenzie, northern Manitoba, southern Ontario, and southern Quebec south to Virginia, Oklahoma, northeastern Utah, and southern Oregon; winters on open plains of Ecuador, Uruguay, and central Argentina.

STATE RECORDS.—Formerly the Upland Plover bred in eastern New Mexico, but it has become so scarce that it is unusual to see half a dozen during a breeding season. [From June 1–18, 1924, on an automobile trip in eastern New Mexico, from Carlsbad to Cimarron by way of Lovington, Tatum, White Lakes, Portales, Clovis, Grady, Tucumcari, Nara Visa, Clayton, Roy, Springer, and Cimarron, a close lookout was kept for it, but only one bird was seen—on June 10, 5 miles southwest of Nara Visa. This was probably a breeding bird. On September 20, 1924, another lone bird was seen in the Jornada, about 4 miles northeast of Engle. In June, 1925, a single bird, apparently one of a breeding pair, was seen near Logan in Quay County. In 1926, when covering the plains and prairie sections of eastern New Mexico in spring, summer, and fall, not one was seen. In May, 1926, however, a few were reported from the Rosebud section (Ligon).] New Mexico lies along the western edge of the migration range of the Upland Plover. [Formerly it was abundant throughout eastern New Mexico during both spring and fall migrations (Ligon).] Many years ago it was found in August on the Rio Grande near Fort Thorn (Henry); and it has been taken in Colfax County (Charles Springer); it was taken near Carlsbad August 6, 1901 (Fuertes), and seen there, August 1–14, 1910 (Dearborn); at the Bolles Ranch



From Biological Survey

UPLAND PLOVER

Overlooking the meadows while it listens to the liquid, bubbling note of its fellow passing overhead

near Carlsbad, September 2, 1901 (Bailey); and on the salt flats west of the Guadalupe Mountains September 2-4, 1902 (Hollister). A single bird was seen in the upper part of the Playas Valley, August 20, 1908 (Goldman).—W. W. COOKE.

NEST.—A slight depression, usually in bare ground, sometimes with a little grass lining, and at others with fine weed stems and a few feathers; generally hidden by surrounding vegetation. Eggs: 4, creamy buff or white, superficial spots snuff-brown and chocolate, deeper ones of violet and lilac, spots more numerous or confluent at larger end.

FOOD.—The vegetable food comprises the seeds of such weed pests as button weed, fox-tail grass, and sand spurs; and the animal food, which amounts to practically 97 per cent, is made up of chiefly injurious or neutral forms, including grasshoppers, crickets, click beetles, wire worms, cut worms, army worms, cotton worms, cotton-boll weevil, clover-leaf and clover-foot weevils, and enemies of cow peas, sugar beets, grapevines, corn, wheat, barley and rye; also horse flies and their larvae, and cattle ticks.

GENERAL HABITS.—The great economic importance and rapidly decreasing numbers of the Upland Plover from uncontrolled cats and dogs, its tameness and slow breeding, the heavy grazing of the grassy plains, and unrestricted shooting make the Federal law protecting it at all seasons of prime importance. Not only in its northern summer home but in its winter range is it in danger. Formerly very abundant on the plains of Argentina, Doctor Wetmore has found it greatly reduced in numbers. Unfortunately, in Argentina it has replaced the Eskimo Curlew as a table delicacy, and is so eagerly sought by gunners that its preservation in settled regions is doubtful (1927a, pp. 13-14). As Mr. Ligon well says: "True sportsmen, everywhere, should not only refrain from shooting Plovers, but should use their influence in preventing others from doing so. Under absolute protection they may be able to save themselves from the brink of extermination" (1927, p. 151).

They are birds of peculiar attractiveness and interest, which we can ill afford to lose. Their delightful bubbling call, *quip-ip-ip-ip*, *quip-ip-ip-ip*, and their musical song, uttered as they pass high over head with the quick wing beats of their characteristic level flight; their gentle way of walking around inspecting you and demurring at your presence on their nesting grounds; their curious heron-like spearing gestures and their protective plumage, which Abbott Thayer considers one of the most highly specialized of grass patterns, all combine to make it a rare pleasure and privilege to study them.

Like most members of the snipe family, Mr. Eaton says, this beautiful bird executes a peculiar musical monologue in the nesting season. It mounts high in the air, or alights on a knoll, "a fence, or even a tree and utters a prolonged mournful whistle, more like the wind than like a bird's voice, which may be heard even in the night, and is one of the most weird and never to be forgotten sounds in

nature . . . the notes rising and swelling, then slowly falling and dying away into a hollow, wind-like whistle" (1909, p. 333).

ADDITIONAL LITERATURE.—BAILEY, F. M., Condor, XX, 112-113, 1918.—FORBUSH, E. H., Educational Leaflet 4, Nat. Assoc. Audubon Soc.—ROCKWELL, R. B., Condor, XIV, 127-130, 1912 (nest).—THAYER, ABBOTT H., Special Leaflet 6, Nat. Assoc. Audubon Soc.; Concealing-Coloration in the Animal Kingdom, Fig. 52, 1909.

SPOTTED SANDPIPER: *Actitis maculária* (Linnaeus)

DESCRIPTION.—*Length:* About 7-8 inches, wing 4-4.6, bill and tarsus each .9-1; outer and middle toes connected by basal webs. *Adults in breeding plumage:* Upperparts silken greenish or bronzy brown with a faint metallic gloss, irregularly flecked with blackish; outer tail feathers barred with brown and white, spread wing with conspicuous white line; axillars white, wing linings and flight feathers brown and white; line over eye white, and underparts white, with large round spots except on chin; iris brown; bill with upper mandible mainly blackish, flesh colored near base, lower mandible chiefly yellow or orange; legs and feet generally yellowish or greenish. *Adults and young in winter plumage:* Upperparts grayish olive or bronzy olive unmarked except for dusky shaft-streaks and barring on wing coverts; underparts unspotted, sides of neck and chest suffused with drab. *Young in juvenal plumage:* Like winter adults but still less glossy; upperparts narrowly barred with pale buff and dusky, giving scaled effect.

RANGE.—Breeds from tree limit in northwestern Alaska, northern Mackenzie, northern Manitoba, northern Quebec, and Newfoundland south to South Carolina, southern Louisiana, southern Texas, southern British Columbia (rarely), Oregon (probably), New Mexico, central Arizona, and southern California; winters from California, Louisiana, and South Carolina to Ecuador, Bolivia, Peru, and southern Brazil; casually to northern Argentina (Wetmore).

STATE RECORDS.—The upper part of the valley of the Pecos River is a favorite nesting place for the Spotted Sandpiper; it breeds at least as low as 6,000 feet at Ribera, where it was found July 2, 1903, and up to 8,000 feet near Willis. Two families of young were seen on the Pecos near the junction of Mora Creek and the Pecos; one family had left the nest on July 15, 1903, and the others were probably a week older (Bailey). An old bird with two young was seen July 15, 1913, on the Chama River west of Abiquiu, and the species is fairly common as a breeder at the Burford Lakes (Ligon). [In 1918, it did not nest on the Burford Lakes, but did along the Brazos, 10-12 miles away (Wetmore). It is common on the Little Rio Grande, Rio Pueblo, and Santa Barbara Rivers; also on the Rio Grande, ranging from 7,000 to 8,000 feet. A nest containing four incubated eggs was found June 27, 1919, on Rio Pueblo, at 7,800 feet (Ligon).] After breeding the species ascends much higher into the mountains, since it was seen at 9,400 feet on the Costilla River, August 23, 1904, and even up to 11,600 feet at the foot of Pecos Baldy, August 15, 1903. It was common at Carlsbad, July 22-31, 1901 (Bailey), and by the last of the month, some birds enter Mexico. It is probable that these early fall migrants led Henry to believe that it nested on the lower Rio Grande near Fort Thorn, but it is also possible that it does nest there occasionally, for one pair nested in 1910 at Elephant Butte, and the species was seen June 10, 1913, on the Rio Grande near Palomas Springs (Ligon); one was also seen June 2, 1907, on the Gila River near Duncan, Arizona, close to the New Mexico line (Bailey).

Fall migration, which begins in July, is in full swing during August and at this time it is the most widespread shore-bird in the State, occurring along any permanent water both on the plains and in the mountains. A considerable number were

seen July 30 and August 25, 1913, near Koehler Junction (Kalmbach). Migration continues through August and the whole of September; one was seen at Lake Burford on September 30, 1904 (Bailey); it was noted near Albuquerque, October 7, 1900 (Birtwell), and was still present along the Gila River near the Arizona line, October 12, 1908 (Goldman). In the winter of 1915-16 it was noted on the Carlsbad Bird Reserve (Willelt).

In the spring migration the arrival of the first was noted at Carlisle April 30, 1890 (Barrell), and at Pecos May 9, 1900 (Birtwell). [On May 7, 1920, two were noted at Grays Ranch, Animas Valley (Ligon). At Lake Burford in 1918, about 25 were seen May 24, and they were fairly common until May 28, when they decreased in numbers (Wetmore).]—W. W. COOKE.

NEST.—A depression in sandy or gravelly ground, on a wet meadow, in a tuft of grass, or under a low bush; sometimes unlined, at others sparsely lined with leaves and grass. *Eggs*: 4, creamy buff or white, superficial spots and blotches reddish or blackish brown, chiefly at the larger end; deeper markings lavender or pale gray.

FOOD.—Almost exclusively aquatic and other insects and their larvae, including locusts and grasshoppers, occasionally even cabbage worms, cutworms, and other garden pests; and also small tadpoles and crawfish.

GENERAL HABITS.—It is interesting to hear from Mr. Alfred M. Bailey of our familiar Spotted Sandpiper being seen out in the open "on the moraine in front of the Muir Glacier," and from Doctor Wetmore that in Porto Rico, where it is the commonest shore-bird most of the year, "it delights to penetrate the darkest depths of mangrove swamps," where movement alone betrays its presence (1927b, p. 364). In our southwest, a spring in an arid valley or a tank on top of a desert range is enough to detain the little bowing, teetering Tip-up on its migration, while a stream bank or bit of bush-bordered beach affords it an acceptable summer home. Here its sweet *peet-weet*, *peet-weet*, *peter-weet* may be heard as, with convex wings and jerky strokes, it skims over the water, the white line along its wing naming it as it disappears around a bend. On the beaches one also hears a sweet *perrr weet*, *perrr weet*. And "during the mating season," Mr. Eaton writes, "the males strut about before the female, swelling up the breast in a manner somewhat suggestive of the Pectoral Sandpiper, until they finally burst forth into the shrill pipe which is the more familiar accompaniment of their lark-like flights, when they rise several feet in the air and at the close of the song drop into the meadow again" (1909, pp. 336-337).

A nest with eggs may be found one day, and in their place the next, a family of little shadowy forms that vanish before the eyes. The old birds are soon ready for the second stage in their rapid, intensive lives, by the middle of August having doffed their worn nuptial plumes and being arrayed in beautiful fresh winter plumage, in fine feathers for their long southward journey.

In Peru, where Doctor Murphy found "the quiet shoreline . . . a favorite winter haven for migrant snipes, plovers, and curlew from

North America," the Peruvians called the Spotted Sandpiper "*tíl-tíl*," for the same reason that we call it *teeter* in its summer home."

ADDITIONAL LITERATURE.—JOB, H. K., Educational Leaflet 51, Nat. Assoc. Audubon Soc.—LEISTER, C. W., Bird-Lore, XXI, 287-289, 1919.—MILLER, O. T., With the Birds in Maine, 146-152, 1904.

SOLITARY SANDPIPER: *Tringa solitaria solitaria* Wilson

DESCRIPTION.—*Wing:* 4.8-5.2 inches, tail 2-2.2, bill 1-1.2. Similar to the Western Solitary but smaller, summer adults more distinctly spotted, white bars on tail averaging wider, and in juvenal plumage with the spotting of the back white or buffy instead of brown.

RANGE.—Breeds in Mackenzie and northern Alberta, possibly also in eastern North America; winters in Porto Rico, Colombia, and Ecuador.

STATE RECORDS.—A specimen now in the United States National Museum, taken at Guadalupita at an altitude of 6,800 feet, on August 7, 1903, by A. E. Weller, gives the only authentic record for New Mexico.

ADDITIONAL LITERATURE.—BREWSTER, WILLIAM, Bull. Mus. Comp. Zool., Harvard, LXVI, 260-264, 1925.

WESTERN SOLITARY SANDPIPER: *Tringa solitaria cinnamomea* (Brewster)

DESCRIPTION.—*Wing:* 5.1-5.5 inches, tail 2.2-2.3, bill 1.1-1.3. *Adults:* Top of head and hind neck brown, sparsely marked with white; back, rump and central upper tail coverts dark olive-brown, *finely specked with whitish, outer tail feathers strikingly barred with white and dusky;* outside wing quills and edge of wing black, inner base of outside quill more or less freckled; *axillars and wing linings* barred blackish brown and white; throat and breast white, narrowly streaked with dark brown; *belly white;* iris brown, eyelids white, bill blackish, legs and feet olive. *Young in fall:* Light spots on back, and wings brownish buffy or cinnamon; streaked pattern of underparts more diffuse.

COMPARISONS.—The Western Solitary can be distinguished from the adult Spotted Sandpiper by slightly larger size, whitish specks instead of black markings on upperparts, more sharply barred outer tail feathers, brown, streaked *neck band*, and absence of wing bar and large spots on underparts. It can also be distinguished from the young Spotted Sandpiper by the markings of upperparts, wings and tail, but might be confused by similarity of underparts. (See page 264.)

From the Solitary, the Western Solitary is distinguished by slightly larger size, summer adults less distinctly spotted with whitish, white bars on tail narrower (blackish ones broader), middle tail feathers often wholly brownish gray; *young with spotting of upperparts brownish buffy or cinnamomeous instead of white* (Ridgway) and freckling on the inner web of the outside primary (Brewster).

RANGE.—Probably breeds from Kotzebue Sound, Alaska, and the Athabaska and Mackenzie region south to western Alberta and northern British Columbia; winters as far south as Uruguay and Argentina.

STATE RECORDS.—Judged by the number of records the Western Solitary is a common sandpiper in New Mexico. It occurs, however, only as a migrant, for the statement that it breeds in the State was based on neither eggs nor young, but merely on the presence of old birds during the summer season. As the species has the queer habit of starting on its southward migration before the middle of summer, its occurrence during the month of July is no proof of breeding. It is not probable that it breeds anywhere within five hundred miles of New Mexico, but fall migrants

had already reached the Zuni Mountains by July 24, 1905 (Hollister), and Albuquerque July 28, 1908 (Bailey). Fall migration is in full swing even in southern New Mexico early in August, since the species was taken in the Guadalupe Mountains, August 9, 1901 (Bailey), and in Animas Valley, August 9, 1908 (Goldman). In northern New Mexico, near Koehler Junction, it was quite common on August 20 and 25, 1913 (Kalmbach). Migrants continue abundant through the whole month of August and much of September and occurred from the lower parts of the State up to 7,500 feet at Beaver Lake, August 27, 1908 (Birdseye), and to 8,000 feet near Ocate Crater, September 6, 1903 (Surber). At Mesilla it was noted September 1, 1913, and at State College, September 20, 1914 (Merrill). A late migrant was taken near Acoma, September 26, 1906 (Bailey). The latest records for the State come from the valley of the Gila near the Arizona line where the species was still present October 12, 1908 (Goldman).

After spending the winter in South America it passes through New Mexico again in the spring migration and was noted at Las Vegas on May 8, 1902 (Atkins).—W. W. COOKE.

NEST.—In trees, in the abandoned nests of other birds.

FOOD.—Grasshoppers, locusts, and many other insects.

GENERAL HABITS.—The Western Solitary Sandpiper is a quiet bird usually found walking about alone on grassy mud flats, wet meadows, or along the borders of small pools looking for food, as Mr. Bailey notes, "pausing now and then with head erect to make a teetering bow." When wounded, like the Spotted Sandpiper, the Solitary is said to dive and swim under water. In migration Mr. E. A. Preble has frequently seen it perch in bushes or low trees around small pools. In Alaska, in May, Doctor Grinnell found it on the border of ponds among the densest spruce woods; and in the early mornings the male would be seen high over the tree tops making a slow circuitous flight on rapidly beating wings, uttering a weak song "somewhat resembling the call of a Sparrow Hawk," while the female was feeding around some grassy pool beneath, apparently "unmindful of the ecstatic efforts of her mate" (1900, p. 26).

WESTERN WILLET: *Catoptrophorus semipalmatus inornatus* (Brewster)

DESCRIPTION.—*Length:* About 15-16 inches (Grinnell, Bryant, and Storer); wing 7.9-8.3, tail 3.1-3.5, bill 2.3-2.7, tarsus 2.4-2.9. *Bill straight*, rather heavy; front toes webbed at base. *Adults in breeding plumage:* Top and sides of head blackish brown, streaked with whitish; back mainly black with slight bronzy sheen, mottled with buffy or white; body mainly gray marked with dusky, upper tail coverts and base of tail white, end of tail gray; wings with striking black and white pattern above and below; "terminal third of primaries and all of primary coverts, black; basal two-thirds of primaries and most of secondaries, white . . . under surfaces of primaries and secondaries like outer surfaces" (Grinnell, Bryant, and Storer); underparts, except for white belly, streaked and spotted, suffused with buffy; iris brown; bill blackish, gray at base; legs and feet olive gray. *Adults in winter plumage:* Similar to summer adults but upperparts, neck, breast, and sides uniform grayish brown, fading to white on belly. *Young in juvenal plumage:* Like winter adults, but upperparts and sides brownish with buffy and blackish feather markings; underparts white, except for belly, suffused with buff and finely spotted with pale brown.

RANGE.—Breeds from Oregon, southern Alberta, Saskatchewan, and southern Manitoba, North Dakota, and Minnesota south to Nebraska, Wyoming, Utah, and northern California (non-breeding birds have been observed in summer as far south as Lower California, Colorado, Alabama, and Florida); winters from California, Texas, and Gulf coast through Mexico and western coast of Central America to western Ecuador, Peru, and the Galapagos Islands; casual in the interior States east of the Mississippi, Washington, British Columbia, and Alaska.

STATE RECORDS.—Both spring and fall the Western Willet passes through New Mexico in migration. It was noted in May, 1857, near the Rio Mimbres (Henry). [On May 6, 1920, 22 were seen at surface tanks at two windmills, 35 miles south of Silver City and May 7, 20 were seen at Walnut Wells (tank and windmill) both points about 4,800 feet (Ligon). On May 27, 1918, the species was noted at Lake Burford (Wetmore). On May 11, 1919, 25 miles southeast of Silver City (Kellogg).] On the return in the fall a few were seen August 6 and 19, 1913, near Kochler Junction (Kalmbach), and it had already crossed the State to Carlsbad by August 16, 1901 (Fuertes). Near the Capitan Mountains it was taken August 28, 1903 (Gaut); [four miles north of Albuquerque, one was seen, September 3, 1920 (Ligon)]; at Zuni it was taken September 4, 1851 (Woodhouse); at Carlsbad, noted on September 12, 1901, and at Boulder Lake on September 15, 1904, at 7,500 feet (Bailey). It was said by Coues to breed in New Mexico, but there seems to be no sure foundation for the statement; neither does it winter in the State but retires to the Gulf coast and Mexico.—W. W. COOKE.

NEST.—Sometimes a mere depression in the ground lined with a few stems of dry grass; at others, in a tussock of grass, rather bulky, made of grass and various plant stems. Eggs: 3 to 4, grayish white, buff, or olive marked boldly with spots of browns and "subdued purple," especially about larger end.

FOOD.—Weevils, aquatic insects and their larvae, parasitic worms, snails, shrimps, and spider crabs.

GENERAL HABITS.—The Western Willet is a surprising, spectacular bird. My first was seen on the Bolles Ranch near Carlsbad. A loud screaming note called my attention to him—a large nondescript grayish bird standing on the edge of an irrigation pond in an alfalfa field. After jerking his head forward and back nervously for a few moments as he watched us, he threw open his wings, displaying their astonishing black and white pattern, and as I gazed bewildered, flew off, his wings on the down stroke looking black, on the up stroke, black and white (1910a, p. 163).

A mother with nearly grown young, encountered as we drove over the prairie in North Dakota, kept crying *wil-let, wil-let*, as she flew around us. "Decoying with heroic fearlessness, she flew around close over us, lighting in the grass beside the road, on the road ahead of our dog, and actually on the side of the pool in which the dog stood—where she was reflected in the water. No exposure was too great, no risk too heavy to draw the fire from her young" (1918, p. 114).

ADDITIONAL LITERATURE.—JOB, H. K., *Wild Wings*, 249-255, 1905.

GREATER YELLOW-LEGS: *Tótanus melanoléucus* (Gmelin)

PLATE 27

DESCRIPTION.—Length: 12.1-15 inches, wing 7.5-7.7, bill 2.2-2.3, tarsus 2.5-2.7. Adults in breeding plumage: Top of head and hind neck streaked with black and white,



- Daniel Denon's Plates -

From Biological Survey

THE GREATER YELLOW-LEGS
Their long yellow legs give them their name

upperparts heavily mottled with black, gray, and white; tail coverts and basal half of tail white, terminal half imperfectly barred; wing quills blackish brown, under surface of flight feathers more or less marbled; underparts white, marked with blackish except on belly; iris brown; bill blackish, legs and feet bright yellow. *Adults in winter plumage:* Similar but upperparts without black markings, light gray, spotted with white; underparts mainly white, finely streaked on throat and chest and irregularly marked with gray on sides and flanks. *Young in juvenal plumage:* Like summer adults but upperparts dark brown, with buffy instead of white feather margins.

COMPARISONS.—Size, height, slenderness, gray plumage, conspicuous white tail coverts, long yellow legs, and absence of buffy or rusty mark the Greater Yellow-legs; while it is distinguished from the Lesser or Yellow-legs not only by greater size but relatively longer, stouter bill (Forbush). (See p. 270.)

RANGE.—Breeds from southern Alaska, southern Mackenzie, and northern Ungava south to Labrador, Manitoba, and (probably southern) British Columbia; winters from southern United States (casually Washington), the Bahamas, Porto Rico, and the Lesser Antilles over a vast area in South America to the southern extremity of the continent as far as Tierra del Fuego (Wetmore).

STATE RECORDS.—Ranging completely across the United States from ocean to ocean, the Greater Yellow-legs would be expected to occur in New Mexico, where until about fifty years ago it was a fairly common migrant. It has been recorded in various years from July until winter. Early fall migrants were found July 19, 1901, at Pecos, and at a water tank (6,200 ft.); August 3-9, 1901, in the Guadalupe Mountains (Bailey); others August 6, 1912, at Carlsbad (Dearborn); August 20 and 25, 1913, three or four near Kochler (Kalmbach). [On August 28, 1917, it was noted between Socorro and Albuquerque, and September 3, 1920, four were seen on lakes 4 miles north of Albuquerque (Ligon); in the fall of 1919 a few near Albuquerque on the river sandbars (Leopold)]; noted at Carlsbad, September 3, 1901 (Bailey), and September 12-24, 1892 (Dutcher); a large flock was observed September 21, 1902, near Roswell (Gaut). Woodhouse in 1851 recorded the species from both Albuquerque and Zuni and a few years later Henry took specimens both spring and fall on the Rio Grande near Fort Thorn. At this time they stayed so late in the fall that Henry believed some of them would winter, as they do near the mouth of the Rio Grande. They were noted on the Carlsbad Bird Reserve in the winter of 1915-16; lone seen there in December, 1916 (Willett)].

A late spring migrant was seen at Albuquerque May 6, 1901 (Birtwell). In 1913 two birds were seen June 15 near Tularosa (Ligon), but of course they must have been non-breeders. No migrants were seen in 1913 until August 7, when two were noted on Dulce Lake (Ligon)].—W. W. COOKE.

FOOD.—Snails, insects, worms, small shrimps, and minnows.

GENERAL HABITS.—At Carlsbad during the fall migration of 1901 on the Bolles Ranch—the irrigated alfalfa ranch where we found acres of shore-birds, including sandpipers of all sizes and kinds from noisy Greater Yellow-legs, jocosely called yelpers, to the quiet little sandpipers and plovers, strikingly winged Willets, handsome Black-necked Stilts, Long-billed Avocets, and Curlews—one meadow was irrigated at a time, and so a field that one day was all water, white wings, and a babel of bird notes, on the next would be dry, bare, and silent, the multitudes having followed the man with the shovel. When a field was left strewn with dead minnows, flocks of Yellow-legs, hundreds

of Yellow-legs—both Greater and Lesser—busied themselves picking them up. As they walked about, their large size, elongated bills, long slender necks and slender gray bodies distinguishing them, they moved their heads back and forth like doves, occasionally tipping a little and gleaning now from a ditch bank, now from a shallow, and now on the dried field where the silvery minnows shone in their bills. When approached they rose in flocks crying *tu-weep, tu-weep*, as they flew showing the white tail and rump, as they wheeled, the white of their sides, and as they circled in, the tern-like angular bend of the wing. And as they lit, for a moment they held their wings raised high over their backs in the beautiful recognition pose of birds with distinctive wing markings (1910a, p. 161; and MS).

In Alaska, Mr. Swarth saw them "going through various courting antics, posing with upraised quivering wings, or running in circles on the sand bars, around the object of their attentions, and incessantly uttering the shrill whistle peculiar to the species" (1911a, p. 53).

ADDITIONAL LITERATURE.—NICHOLS, J. T., and FRANCIS HARPER, Auk, XXXIII, 248-250, 1916.

YELLOW-LEGS: *Tótanus flavipes* (Gmelin)

DESCRIPTION.—*Length*: 9.5-11 inches, wing 6.1-6.6, bill 1.3-1.5, tarsus 2-2.1. Like the Greater Yellow-legs in all plumages but smaller, bill proportionally smaller and more slender and legs relatively longer, markings on underparts less extensive, and *without fine marbling on under surface of flight feathers*. (See p. 269.)

RANGE.—Breeds from Kotzebue Sound, upper Yukon Valley, northern Mackenzie, northern Manitoba, and northern Quebec south to central Quebec (probably southern Manitoba), Saskatchewan, and southern Alberta; winters in West Indies, Ecuador, and southern South America over a wide area and about lakes up to 10,000 feet; migrates mainly east of the Rocky Mountains.

STATE RECORDS.—The smaller Yellow-legs is much more common in New Mexico than the Greater, but nearly all the records refer to fall migration. A specimen was taken in the Guadalupe Mountains August 7, 1901 (Bailey); several were seen at Beaver Lake, August 26-27, 1908 (Birdseye); near Las Vegas August 31, 1903 (Bailey); near Koehler Junction August 21, 23, and 25, and September 6 and 12, 1913 (Kalmbach); Apache, September 7 and 13, 1886 (Anthony); Zuni, September 12, 1851 (Woodhouse); Mesilla, September 1, 1913 (Merrill); Carlsbad, September 3-14, 1901 (Bailey); a large flock near Roswell as late as September 21, 1902 (Gaut); and one bird at Albuquerque October 7, 1900 (?) (Birtwell). Woodhouse found Yellow-legs at both Albuquerque and Zuni the fall of 1851 and Henry considered them as one of the abundant migrants in August and September along the Rio Grande at Fort Thorn. [Between Socorro and Albuquerque in 1917, 12 were seen August 28, 12 or more September 4, and at lakes four miles north of Albuquerque, great numbers, September 3, 1920 (Ligon). Near Albuquerque on the frozen river in zero weather two were seen December 26, 1918 (Leopold).]

Since the species is not rare at this season along the foothills of eastern Colorado, and was taken by Mearns April 14, 1892, at Lake Palomas on the New Mexico-Chihuahua line, it will undoubtedly be found at other places in eastern New Mexico.

—W. W. COOKE.

SNIPES, SANDPIPERS, ETC.: PECTORAL SANDPIPER 271

FOOD.—Aquatic worms, grasshoppers and many other insects, snails, and other small mollusks.

GENERAL HABITS.—While the notes as well as the general habits of the two Yellow-legs are much alike, the Lesser, Mr. Eaton says, is “slightly more vociferous, uttering more notes in succession, commonly following the formula, *whew, whew-whew-whew-whew, whew-whew, whew*” (1909, p. 326). Messrs. Nichols and Harper add a “musical ‘summons’ call, *toó-whew toó-whew, toó-whew*, almost identical with that of the Greater Yellow-legs, but apparently not so loud” (1916, pp. 250–251).

A migrating Yellow-legs, on August 1, 1912, came aboard a sailing schooner, the Captain reported to Doctor Wetmore, midway between Bermuda and Porto Rico. In South America, Doctor Wetmore writes that in the case of the Yellow-legs, “as in that of other migrant species from North America, it was instructive to note that the migration southward came in September and October when the birds traveled southward with the unfolding of the southern spring and that the return northward was initiated by the approach of vigorous weather in far-away Patagonia,” and he adds that “during early April the migration became a veritable rush so that on the night of April 5, at Tucuman, the air was filled with the cries of these and other waders in steady flight northward above the city” (1926b, p. 150).

ADDITIONAL LITERATURE.—BREWSTER, WILLIAM, Bull. Mus. Comp. Zool., Harvard College, LXVI, 259–260, 1925.—NICHOLS, J. T., Auk, XXXVII, 530–534, 1920.—STREET, J. F., Auk, XL, 577–583, 1923.

SANDPIPERS: Subfamily Calidrinae

PECTORAL SANDPIPER: *Pisóbia melanótos* (Vieillot)

DESCRIPTION.—Length: 8–9.5 inches, wing 5–5.5, bill 1.1–1.2, tarsus 1–1.1. *Tip of bill expanded and heavily pitted*; middle tail feathers pointed and projecting. *Adults in breeding plumage*: Upperparts generally, including wings, light brown streaked and spotted with black; feathers with black center, edged with ash or reddish brown, rump, median upper tail coverts and middle tail feathers black, lateral coverts white, spotted; outer tail feathers brownish, edged with white; wing quills dark brown, axillars white, outside wing linings mottled or dusky; chin and belly white, chest buffy, finely streaked with blackish brown making an abrupt wide pectoral band; iris brown, bill, legs and feet greenish yellow or yellowish green in life. *Adults in winter plumage*: Similar, but the rusty tint above almost or wholly wanting, breast buffy, streaks indistinct. *Young in juvenal plumage*: Similar to summer adults but long feathers of back and shoulders more extensively edged with white, buffy of breast more intense and less sharply streaked; legs and feet lighter or yellower than in adults.

COMPARISONS.—The White-rumped and Pectoral sandpipers have greenish legs; the Baird, black legs. The White-rumped and Baird have similar breast bands but the color of the upper tail coverts, black and white in the Pectoral, brown and gray in the Baird, and white in the White-rumped, as well as the longer bill, at tip expanded and heavily pitted in the Pectoral, while only “sensibly widened” and slightly pitted in the White-rumped, together with the darker, more conspicuous breast band of the Pectoral are distinctive characters. (See p. 273.)

RANGE.—Breeds mainly on the Arctic coasts of Alaska and Mackenzie, but also in northeastern Siberia and on Hudson Bay; winters from Peru and Bolivia to Argentina and Chile.

STATE RECORDS.—During fall migration the Pectoral Sandpiper is common throughout most of the Mississippi Valley west to the eastern foothills of the Rocky Mountains on its way from the Arctic coast to South America. It was found common September 13, 1886, at Apache, New Mexico (Anthony), and undoubtedly occurs regularly in the fall migration, though there is only the one definite record.—W. W. COOKE.

GENERAL HABITS.—The "stocky, short-necked, short-legged" Pectoral Sandpiper or Grass Snipe, slightly smaller than a Killdeer, like the Wilson Snipe has a marked grass pattern, is found in swamps and in meadows and flats with scattered cover, rather than on open beaches, and like the Wilson crouches in the grass and rises singly with zigzag flight when approached. The heavy streakings of its breast ending abruptly in a horizontal line on its white belly, which give it the name of Pectoral Sandpiper, are said to make a striking field character, but when the bird stands erect, cut its figure into two sections, with protective effect.

One of the Pectoral's ordinary notes is a squeaky grating whistle from which it gets the name of Krieker, but in the breeding season, as Doctor Nelson discovered when at the mouth of the Yukon, it inflates its throat and breast to twice or more their natural size and by means of this great air-sac utters a deep hollow and resonant note suggestive of the booming of the Prairie Chicken (1887, p. 108). One that Mr. H. B. Conover saw fly by with pouch distended, jerked his head up and down as he gave his call, as if "swallowing air to inflate his throat" (1926, p. 307). Mr. O. J. Murie, who accompanied Mr. Conover, "caught some newly hatched young, and holding his hand containing them extended on the ground, induced the old bird to come up and brood the chicks. She was so tame that he caught and banded her without difficulty" (Conover, 1926, p. 307).

"In common with many other shore-birds," Professor Cooke said, "the Pectoral Sandpiper begins its fall migrations in July" or even in June, the first reaching Argentina by the end of August (1910, pp. 36-37). By February 8, Doctor Wetmore says, a few have been seen "evidently bound north on the return migration," but small numbers remain in Argentina until late in April or even May. The supposition that they breed in the south is without basis in fact. Though hunted to some extent, they go about in such small bands and are distributed over so broad an area that they do not suffer extensively at the hands of gunners (1927a, p. 9).

ADDITIONAL LITERATURE.—BREWSTER, WILLIAM, Bull. Mus. Comp. Zool., Harvard College, LXVI, 242-244, 1925.

WHITE-RUMPED SANDPIPER: *Pisóbia fuscicóllis* (Vieillot)

DESCRIPTION.—*Length:* 6.7–8 inches, wing 4.9–5, bill .9–1, tarsus .9–1. Toes long and slender and slightly margined. *Adults in summer plumage:* Head and back heavily striped with black and light rusty, rump grayish brown, upper tail coverts white, tail grayish brown; underparts white; neck, breast, and sides streaked and spotted, washed with buffy, color of breast fading gradually below; iris brown, bill mainly black, lower mandible, legs, and feet dark greenish. *Adults in winter plumage:* Wings, rump, upper tail coverts, and tail as in summer, striping of back less distinct, color lighter, grayish brown. *Young in first winter plumage:* Like winter adults but feathers largely marked with tawny, and chest buffy or pale fulvous. (See Comparisons under Baird and Pectoral Sandpipers, p. 271).

RANGE.—North and South America mainly east of Rocky Mountains and Andes. Breeds (eggs taken) at Point Barrow, Alaska, Herschel Island, Yukon, Taylor Island, Victoria Land, Fort Anderson and Rendezvous Lake, Mackenzie, and Baffin Island; winters in eastern South America, chiefly from central to southern Argentina and south into extreme southern Chile and the Falkland Islands.

STATE RECORDS.—Nearly seventy years have elapsed since the latest record was made of the White-rumped Sandpiper in New Mexico. When Woodhouse crossed the State in 1851, he met it near Albuquerque and again, September 16, on the Zuni. The next year, in October, Henry collected two specimens near Fort Fillmore. These records constitute the entire history of the species to date in New Mexico.

Migrating through the Mississippi Valley and occasionally along the eastern foothills of the Rocky Mountains, it probably still occurs rarely in the Rio Grande and Pecos Valleys of New Mexico.—W. W. COOKE.

GENERAL HABITS.—The White-rumped Sandpiper, which suggests the Pectoral in appearance but for its more rufous, striped upperparts and strikingly white rump, which flashes plainly as its passes, "certain advertisement of the species" especially in conjunction with its greenish legs, is found mainly on muddy flats or sandy shores.

In South America, Doctor Wetmore found it in Paraguay from September 6 to 21, 1920, its southward migration coming with a rush, and later in Argentina on its winter range on the pampa, he found it the "most common of the migrant shorebirds, two thousand or more sometimes being seen in a day" (1927a, pp. 9–10).

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 142, 181–193, 1927 (courtship, nesting, behavior, etc.).—BREWSTER, WILLIAM, Bull. Mus. Comp. Zool., Harvard College, LXVI, 244–246, 1925.

BAIRD SANDPIPER: *Pisóbia baírdi* (Coues)

DESCRIPTION.—*Length:* 7–7.6 inches, wing 4.6–4.8, bill .9–1, tarsus 1. Bill slender, acute. *Adults in breeding plumage:* Upperparts pale grayish buff, streaked and spotted with black; lower back, rump, central upper tail coverts, and middle tail feathers brown, outer tail feathers grayish; wings brown, feathers edged with lighter; axillars and most of under wing coverts white; throat white, breast with light buffy band, lightly streaked or spotted; sides and belly white; iris brown, bill, legs, and feet blackish. *Adults in winter plumage:* Upperparts grayish clay, obscurely streaked; underparts whitish, chest buffy. *Young in juvenal plumage:* Upperparts buffy drab,

back, shoulders, and wing coverts with white tips (worn in winter) giving *scaled effect*; head and chest indistinctly streaked with dusky, breast band pinkish buff.

COMPARISONS.—Though similar to the White-rumped, the Baird Sandpiper may be recognized in flight in any plumage by its *brown* instead of white upper tail coverts. In summer it differs by lacking the rufous above and having *white* instead of spotted sides. In winter plumage its buffy breast and paler upperparts are characteristic. From the Pectoral Sandpiper it differs in smaller size, blackish feet, and less sharply and extensively streaked breast band; from the Least and Western Sandpipers by its slightly larger size, buffy tone, and less distinct streaking on breast.

RANGE.—Northeastern Asia and North and South America. Breeds on or near the Arctic coast from northeastern Siberia and Point Barrow, Alaska to Yukon, Mackenzie, Baffin Island, and probably Greenland; winters in Chile and western Argentina; casually, at least, to Falkland Islands.

STATE RECORDS.—From its far northern breeding grounds along the Arctic coast, the Baird Sandpiper comes south in the fall and crosses New Mexico on its way to its winter home in southern South America. All of the records refer to its occurrence in the fall, when it was noted as early as July 30—also August 25 and 27, 1913, near Koehler Junction (Kalmbach); August 15, 1903, near Sierra Grande (Howell); August 26–27, 1908, at Beaver Lake (Birdseye); on the salt flats west of the Guadalupe Mountains, September 2, 1902 (Hollister); on the plains 12 miles north of Las Vegas, September 2, 1903 (Bailey); Apache, September 7, 1886 (Anthony); Albuquerque, September 7–10, 1900 (Birtwell); found common in irrigated alfalfa fields near Carlsbad September 3–14, 1901 (Bailey); noted at Zuni, September 16, 1851 (Woodhouse); and Horse Lake and Lake Burford, September 22 to October 1, 1904 (Bailey).

The species occurs of course in New Mexico during the spring migration, but is as yet unrecorded there at that season.—W. W. COOKE.

FOOD.—Grasshoppers, locusts, cutworms, ants, clover-root curculios, weevils, flies, crane fly larvae, mosquitoes, earthworms, water beetles, dragon fly nymphs, snails, and sedge seeds, plants, and rootlets.

GENERAL HABITS.—Small flocks of the little Baird Sandpipers are seen in migration along the sandy margins of streams and lakes, around muddy sloughs, and on irrigated fields associated sometimes with the Least Sandpiper or the Killdeer. They appear in different plumages—one taken September 22 at Horse Lake had apparently completed its fall molt, while one taken October 1, at Lake Burford, was still in immature fall plumage. At Carlsbad we were fortunate enough to see a close flock of about fifty, flying with a low twittering *trip trip*. Quiet, modest little sandpipers they are, very different from the big, noisy, dashing Yellow-legs. It is hard to think of them as “globe spanners,” as they have been called, but small as they are, they “traverse the whole length of both continents twice a year” (Bent, 1927, p. 193). After reaching Alaska, their spring chorus, heard by Mr. Alfred M. Bailey, seemed quite in character, suggesting the “singing of many little grass frogs in a meadow pond.” At times a male would rise high in the air, in the way so characteristic of male sandpipers, give forth his song and sail down” (1926, pp. 31–32).

On their spring migration in 1914 they reached their breeding grounds in the frozen tundra of the Arctic coast the latter part of May, Mr. Dixon found, when the two months of continuous daylight had begun. The males and females arrived together, and their courtship, which was witnessed by Mr. Brooks, while without vocal demonstration, was notable for its striking flight and wing movements. As Mr. Brooks describes it, "the male would fly a few feet above the female, while she rested on the ground, with quick erratic wing strokes suggesting a nighthawk. Frequently he would alight and raise the wings high over the back as a gull does before folding them. Then with the forearms perpendicular, the primaries would be slowly raised and lowered like a pump handle, generally lowered to right angles with the forearms, sometimes lower" (Brooks in Dixon, 1917, pp. 79-80).

ADDITIONAL LITERATURE.—BREWSTER, WILLIAM, Bull. Mus. Comp. Zool., Harvard College, LXVI, 246-249, 1925.

LEAST SANDPIPER: *Pisóbia minutilla* (Vieillot)

DESCRIPTION.—*Length: 5-6.7 inches, wing 3.5-3.7, bill .7-.9, tarsus .7. Bill slender; toes slender, cleft to bases. Adults in breeding plumage: Upperparts blackish marked with rusty, buff, and whitish; rump black, middle tail feathers black, outer ones drab; wing with narrow white bar; axillars and wing linings white; chest band pale brownish or buffy grayish, narrowly streaked with brown; belly and flanks white; iris brown, bill black, legs and feet greenish. Adults and young in winter plumage: Similar but without tawny and buff; upperparts ashy brown with darker feather centers; broad chest band less distinctly spotted or streaked. Young in juvenal plumage: Similar to summer adults but markings more blended and indistinct, back and shoulders with white feather margins, wing coverts margined with buffy, chest decidedly buffy, band indistinctly streaked.*

COMPARISONS.—The Least Sandpiper, of sparrow size, is almost a miniature of the Pectoral, even to the color of its legs (Townsend in Bent, 1927, 208). (See p. 271.)

RANGE—North and South America; casual in Europe and Asia. Breeds from northwestern Alaska (Kotzebue Sound), southern Arctic coast and islands, in Mackenzie, Keewatin, northern Quebec, Labrador, and Newfoundland south to Nova Scotia, Hudson Bay region, southern Mackenzie, and southern Alaska; winters from central California, rarely Arizona, southern Texas, South Carolina, and Georgia south through North and Middle America to Brazil, Ecuador, Peru, Chile, and Galapagos Archipelago.

STATE RECORDS.—The Least Sandpiper is an abundant migrant in New Mexico while passing from its summer home in northern Canada to its winter home in Central and South America. Like many others of its kind, it begins its southward journey in the early summer, and by July 26, 1901, had already reached Carlsbad (Bailey), 2,000 miles from the nearest part of its breeding range. Migration continues through August and September. Specimens were taken near Koehler Junction, August 20, 1913 (Kalmbach); it was noted at Beaver Lake, August 26-27, 1908 (Birdseye); Las Vegas September 1, 1903 (Bailey); west of the Guadalupe Mountains, September 2, 1902 (Hollister); Carlsbad, September 5, 1901 (Bailey); Apache, September 13, 1886 (Anthony); and as late as September 30, 1904, at Lake Burford (Gaut).

[On the Carlsbad Bird Reserve, it was seen December, 1916 (Willet).]

In the spring migration the species was found by Mearns, April 8-13, 1892, on the New Mexico-Chihuahua line at Lake Palomas; and as late as May 5 in 1910 near Santa Rosa (Lantz and Piper); it is probably almost as common at this season as in the fall. Two specimens were taken at Lake La Jara, September 17, 1904, whose molt was nearly completed.—W. W. COOKE.

FOOD.—Insects such as grasshoppers and mosquitoes, and minute aquatic animals.

GENERAL HABITS.—The Least Sandpiper, Peep, or Green-legged Peep, as it is familiarly called—known by its size, its short bill, and narrowly streaked breast band—is the smallest and perhaps the most abundant species of shore-bird in North America, during migration being found not only on sea beach and salt marsh but fresh-water inland pond and wet meadow. At Carlsbad, where the Least Sandpiper was seen on the Bolles Ranch, it seemed tiny enough to be the young of some of the larger sandpipers. As we looked around on the busy throngs, the scale was an interesting one, beginning with the Least and going up through the Baird, the Solitary Sandpiper, the Lesser Yellow-legs, and the Greater Yellow-legs, to end with the Curlew.

When feeding in flocks the little fellows give "faint *peeps* in conversational undertone"; in flight the notes, as given by Grinnell, Bryant, and Storer, are "more emphatic and varied: *wheet, wheet, or wheet wheet, wheet, wheet-whrr-terr-wheet*, of plaintive quality" (1918, p. 379). Their loudest and most characteristic call note is given by Messrs. Nichols and Harper as a grating *k-r-r-e-e-p*. When danger is near, they say, the little bird squats, preferably with a lump of mud between him and the enemy! From Santa Barbara, Messrs. Bowles and Howell write, "One frequently finds single birds, or two or three together, pattering around the wet kelp on the ocean beach, often waiting to examine an intruder from under the very feet . . . before taking wing" (1912, p. 9). While often seen singly they are more generally found in flocks, sometimes numbering several hundreds.

When not persecuted by hunters, Mr. Eaton has often had the trustful little fellows trot along in front of him, "gleaning or probing industriously for insects on every side." When off guard in this way they are easy to photograph, and make attractive pictures. As he says, "some consider the little sand-peeps as legitimate game and shoot them by the dozens to be made into 'peep-pies,' but for my part, after associating with the little sandpipers, I am more content to eat chicken pies than to think how dozens of these harmless, interesting birds have been sacrificed for a single meal" (1909, p. 314).

Those who have been fortunate enough to be with the Least Sandpiper on its breeding grounds have been impressed by its courtship song, and Mr. Robert T. Moore has recorded it in musical notation (1912, pp. 210-223). As Dr. Charles W. Townsend describes it,

"The bird springs up into the air on quivering down-curved wings and circles about, now lower, now higher, reaching at times a height of fifty or more yards. In the air it emits a short sweet trill, which is rapidly repeated, and with each song burst the wings are rapidly vibrated." One that he watched remained in the air circling and trilling for five minutes, dropped to the ground only to continue trilling, rose again, to trill, and as he left the bog, followed him, still trilling (in Bent, 1927, p. 202).

ADDITIONAL LITERATURE.—JOB, H. K., Educational Leaflet 52, Nat. Assoc. Audubon Soc.—NICHOLS, J. T., and F. HARPER, Auk, XXXIII, 244-245, 1916.

LONG-BILLED DOWITCHER: *Limnódromus griseus scolopáceus* (Say)

DESCRIPTION.—Length: 11-12.5 inches, wing 5.4-6, bill 2.1-3, tarsus 1.3-1.7. *Adults in breeding plumage:* Top of head and hind neck streaked brownish black and cinnamon, stripe over eye whitish, through eye, dark; upperparts mottled with black, brown, and buff in striking contrast to the *white lower back, rump, and white, spotted, black-barred tail; wings with narrow, light bars; axillars and wing linings barred with brown and white; underparts deep cinnamon or tawny*, specked on throat and barred on sides; iris brown, bill blackish, dark olive basally, legs and feet yellowish green. *Adults in winter plumage:* Line over eye, rump, and belly, white; upperparts grayish brown, marked with dusky, wings as in summer. *Young in juvenal plumage:* Back and wings marked with black and clay-color, rump and tail as in adults; underparts except for whitish belly, buffy or clay-color, with dusky spotting.



FIG. 44. Long-billed Dowitcher skin

COMPARISONS.—The Long-billed Dowitcher may be distinguished in all plumages from all other waders by its moderate size, long bill, white rump, and wing bars.

RANGE.—Breeds from Alaska, Kuparuk River and Point Barrow, and Franklin Bay, Mackenzie, south to Fort Anderson, Mackenzie, Lapierre House, Yukon, and Point Dall, Alaska; winters from California, Texas, Louisiana, and Florida south to Ecuador, Guatemala, Jalisco, and Lower California.

STATE RECORDS.—From their summer home in Canada, a few Long-billed Dowitchers migrate through New Mexico on the way to their winter home in Central America. One out of a flock was taken about 1855 in September on the Rio Grande near Fort Thorn (Henry), and one October 22, 1873, on the Mimbres River (Newberry). Two were taken April 7-9, 1892, on the New Mexico-Chihuahua line near Lake Palomas (Mearns). An adult male was taken, June 1, 1921, on the irrigation pond on the Mimbres River, 30 miles southeast of Silver City in a flock of about 75 Western Willets (Kellogg). These are the only records at present for the State, but although the species has been greatly reduced in numbers of late years, it is probable that a few still continue to visit New Mexico both in spring and fall migration.—W. W. COOKE.

FOOD.—Water bugs, fly and dragon fly larvae, leeches, worms, snails, crabs, shrimps, soft mollusks, and seeds of aquatic plants.

GENERAL HABITS.—The white-rumped, Long-billed Dowitchers may be known by their "open flock formation when feeding," and their "swift erratic flight" (Grinnell, Bryant, and Storer, 1918, p. 359). In southeastern Alaska, Mr. Alfred M. Bailey found them feeding

about a bar, "probing here and there with their long beaks like so many 'jack snipes'" (1927, p. 193). They were among the commonest waders found by Doctor Nelson on Norton Sound, Alaska, and at the mouth of the Yukon on May 12, they were "already engaged in love-making, though the ground was still, to a great extent, covered with snow" (1887, p. 100). In May, 1924, Mr. H. B. Conover found them suddenly "common all over the tundra," and on June 23, he found young out of the nest being led out of danger by their father (1926, pp. 305-306). On the tide marshes at Santa Barbara, on August 11, 1911, ten Dowitchers were reported as still in their nuptial plumage.

[STILT SANDPIPER: *Micropálama himántopus* (Bonaparte)]

DESCRIPTION.—*Length:* 7.5-9.2 inches, wing 5-5.3, bill 1.5-1.7, tarsus 1.5-1.7. *Legs very long and slender, front toes webbed at base. Adults in breeding plumage:* Head striped broadly with rusty and streaked with white; rest of upperparts varied with black, pale gray and buff; upper tail coverts white spotted or barred, tail grayish; underparts soiled white, lower throat and chest streaked, *breast and belly extensively barred*, axillars and under wing coverts mainly white; bill black and greenish, feet and long legs *greenish yellow*. *Adults in winter plumage:* Upperparts mostly brownish gray with light feather edgings; tail coverts, tail and wings much as in summer; underparts white, indistinctly streaked, tail white, marked with ashy; legs and feet dark *greenish*. *Young in juvenal plumage:* Back and scapulars blackish, marked with buffy, whitish, and rusty; upper tail coverts almost pure white; breast and sides suffused with buff.

COMPARISONS.—"Among small sandpipers readily recognized, as its long legs raise its body above the others . . . in fall plumage it resembles young Yellow-legs, but its body is smaller and its legs are *greenish* and not bright yellow; the tail and tail-coverts show whitish in flight, but it lacks the long gray rump and the white on the back shown in flight by the Dowitcher; in spring it may be recognized by its dark back, barred under plumage and long, *greenish yellow* legs" (Forbush). (See pp. 270, 278.)

RANGE.—"The Stilt Sandpiper is one of the rarer shore-birds and but little is known of its range and migrations" (Bent, 1927). Breeds probably in northeastern Alaska, Yukon, Keewatin, and Manitoba, but eggs have been taken only in northern Mackenzie; winters, presumably, in southern South America, but it was found by Wetmore only in Paraguay. Its numbers have been considerably reduced and it seems very local in its winter range (Wetmore). It is a scarce but probably regular fall migrant in British Columbia (Brooks and Swarth).

STATE RECORDS.—Breeding in the Arctic regions and wintering in South America, the Stilt Sandpiper in journeying between its winter and summer homes is found most commonly in the district between the Mississippi River and the eastern foothills of the Rocky Mountains. This should make it a migrant in New Mexico as it is in Colorado and over much of Mexico. It was taken April 7, 1892, on the New Mexico-Chihuahua line at Lake Palomas (Mearns), scarcely more than a mile outside of New Mexico, but as yet there is no certain record for the State.—W. W. COOKE.]

WESTERN SANDPIPER: *Ereunètes maúri* Cabanis

DESCRIPTION.—*Male:* Wing 3.6-3.7 inches, bill .8-.9, tarsus .8-.9. *Female:* Wing 3.7-3.9 inches, bill 1-1.1, tarsus .9. *Front toes with webs at base. Adults in late spring and summer:* Upperparts with feathers black centered, *conspicuously edged*

with tawny, and faintly tipped with whitish or pale drab; rump dark brown, upper tail coverts brown and white; tail brown and drab; wing with white bar shown in flight, axillars and wing linings white; underparts white, streaked, except on belly but *without buffy ground color*; most heavily streaked with V-shaped spots on chest and sides; iris brown, bill, *legs and feet black*. *Adults and immature in fall, winter, and early spring*: Upperparts ashy brown or brownish gray, with blackish shaft streaks and in fresh plumage white feather tippings, giving scaled effect; chin white, upper breast narrowly streaked; rest of underparts white. *Young in juvenal plumage*: Like summer adults but upperparts duller, feathers of back with broad tawny margins, wing coverts tipped with buffy, and breast washed with buffy, mainly unstreaked.

COMPARISONS.—Next to the Least Sandpiper in size, at a distance the Western can be told from it with difficulty by its longer bill, but in the hand the webbing between the bases of the front toes readily distinguishes it. In spring and in most autumn birds the back is strongly ruddy, more so than in the Least, and with a well defined ruddy bar across nape, while the breast spots are heavy and sharp. (See p. 275.)

RANGE.—North America, Central America, the West Indies, and northern South America. Breeds, so far as known, only in Alaska (has been taken in summer in northeastern Siberia); winters on the Pacific, Gulf, and South Atlantic coasts of the United States, the West Indies, Central America, and South America, in Venezuela, Ecuador, and Peru.

STATE RECORDS.—The principal migration route of the Western Sandpiper is west of the Rocky Mountains, but each fall a small percentage of the species wanders east of the mountains and spreads over much of the Eastern United States. A few individuals have been recorded in New Mexico: West of the Guadalupe Mountains, September 2, 1902 (Hollister); the Rio Grande and Mimbres rivers (Henry); Mesilla, September 1, 1913 (Merrill); Albuquerque, October 5, 1900 (Birtwell).

The species has not yet been taken in New Mexico in spring and is undoubtedly rare on the return migration, but since it was taken May 11, 1892, at Mosquito Springs, Chihuahua (Mearns), close to the New Mexico line, it is evident that a few migrate north by this route.—W. W. COOKE.

GENERAL HABITS.—The Western Sandpiper, next to the smallest of the shore-birds, readily distinguished by size from the great majority of our waders, is seen almost entirely in flocks, which scatter out to feed but gather when frightened and rise in close flocks. As these flocks are described by Mr. Alfred Bailey, they can "usually be seen swirling white against the light, and again seeming to disappear" (1927, p. 194). About the middle of May, Doctor Nelson tells us, these birds reach the shores of Bering Sea, when they become very common, and, by the end of the month, forsake "the borders of icy pools and in twos and threes are found scattered over the tundra, showing a preference for small dry knolls and the drier tussock-covered parts of the country in the vicinity of damp spots and small ponds. Here the gentle birds may be seen at all times tripping daintily over the moss or in and out among the tufts of grass, conversing with each other in low, pleasant, twittering notes" (1887, p. 113).

During courtship the males sail around on set wings, whistling as they go. When nesting the parents are very solicitous, decoying

pitifully, their neighbors joining forces to protect both eggs and young (Conover, 1926, p. 309). On their migrations, Messrs. Bowles and Howell write from Santa Barbara, "sometimes these little gleaners fairly swarm in their favorite haunts, and it is a beautiful sight, when some Marsh Hawk in search of mice flops over them, to see the whole flock rise as one bird and go through precise evolutions of wheeling and fleeing up the shore, all the time twittering blithely" (1912, p. 9).

SANDERLING: *Crocethia álba* (Pallas)

DESCRIPTION.—*Length:* 7-8.7 inches, wing 4.7-5, bill .9-1, tarsus .9-1. *Toes only three.* *Adults in breeding plumage:* Foreparts and back pale rusty or cinnamon mixed with grayish white and streaked with black; rump brownish gray, feathers darker centrally, edged with pale gray and white; upper tail coverts and tail grading from black through brown to white; wing with conspicuous white bar, strikingly contrasted with blackish quills, axillars and wing linings white; chin, throat, and underparts immaculate white in strong contrast to rusty of neck and chest; iris brown, bill, legs, and feet black. *Adults in winter plumage:* Face and underparts snowy white; upperparts gray with dark shaft streaks except for blackish quills and bend of wing. One still in the breeding plumage was seen by Bowles and Howell August 25, 1911. *Young:* Above pale grayish, spotted with blackish and whitish; chest more or less tinged with dull buff.

COMPARISONS.—The striking white bar in sharp contrast to the black quills is characteristic in all plumages, the rusty or cinnamon fore parts characteristic in summer and the pure white breast and pale gray back in fall plumage.

RANGE.—Nearly cosmopolitan. Breeds on Arctic coast and islands from Point Barrow, Alaska, to northern Greenland; also in Iceland, Spitzbergen and northern Siberia; winters in the Western Hemisphere from British Columbia (a few), Washington, California, Texas, and east to coast of Virginia south to Argentina and Chile.

STATE RECORDS.—There are about a dozen records of the Sanderling in Colorado covering both migrations; and it is probably equally rare in New Mexico. About 1854 Dr. Henry saw a few in September near Fort Thorn, and this constitutes the sole record of the species in New Mexico.—W. W. COOKE.

HABITAT.—As the Sanderling is usually found on the pale sands of the seashore in migration and in winter, its whiteness at those times as well as its absence from New Mexico are easily understood.

AVOCETS AND STILTS: Family *Recurvirostridae*

The twelve species comprising this family are distributed throughout the warmer parts of the world.

They are called Wading Snipe, as they feed in shallow water, wading to their bellies, but when necessary they swim with ease. In correlation with their habits, their legs and bills are extremely long and slender, their toes



From Handbook of Western Birds (Fuentes)

FIG. 45. Avocet

webbed at base, and their plumage underneath dense as in true water-birds.

AMERICAN AVOCET: *Recurvirostra americana* Gmelin

DESCRIPTION.—*Length*: 15.5–18.7 inches, wing 8.5–9, bill 3.4–3.6, *recurved* (straight or nearly so in young), tarsus 3.7–3.8, middle toe 1.6–1.7. Hind toe small, feet extensively webbed. *Adults in breeding plumage*: Foreparts light cinnamon except for whitish area around eye and at base of bill; rest of body white; wings mainly black and showing blackish V set in white; iris brown, bill black, often pale at base below; legs and feet pale blue. *Adult winter and immature plumage*: Cinnamon replaced above by gray, below by white. *Young in juvenal plumage*: Crown dull gray, nape tinged with reddish brown; shoulders and back marked with brown or buff, wing quills slightly tipped with whitish.

RANGE.—Breeds from Washington, northern Idaho, Alberta, Saskatchewan, North Dakota, Minnesota, and Wisconsin south to western Iowa, central Kansas, rarely southern Texas, southern New Mexico, northern Utah, Nevada, and southern California (recorded in summer in Manitoba); winters from California and southern Texas south to Guatemala, western Mexico, and Lower California (casual straggler over southern boundary of British Columbia).

STATE RECORDS.—The most southern limit of the breeding range of the Avocet is found in New Mexico, where the bird nests south to Carlsbad, 3,000 feet altitude (Bailey), and Chloride, 7,500 feet (Blinn). It also breeds at Las Pinos (Coues), and in 1898 was still a common breeder near Las Vegas up to 8,500 feet (Mitchell). On the Carlsbad Bird Reserve 60 were noted April 29, 1914 (Cooper). In the spring it arrives in early April—Albuquerque, April 14, 1901 (Birtwell)—and remains in numbers until late August. During the summer of 1913, a pair spent the entire season at Mesquite Lake, near Mesilla Park (Merrill), but it is possible that they were non-breeders. It is rather rare in the central and western parts of the State, but more common in the eastern part (1916–1918). On June 6, 1924, a nest with eggs was found at Deep Lake, about 30 miles northeast of Roswell. About a dozen pairs of apparently breeding birds were seen here and on White Lake. On June 7, several nesting birds were seen at a large shallow lake east of Elkins and south of the Roswell-Portales Highway. On June 10, five or six apparently breeding birds were seen at a lake on the plains about 30 miles south of Clayton (Ligon). It was recorded August 12, 1820, by Major Long's party, apparently near where the Canadian River crosses the Texas-New Mexico boundary, but from the uncertainty of the location it can not be considered an authentic New Mexico record (in James, 1823, Vol. II, p. 115). It was noted August 28, 1845, on the headwaters of the Canadian (Abert), September 3, 1913, near Koehler Junction (Kalmbach), to September 7, 1886, at Apache (Anthony), October 12, 1846, Las Palomas (Emory), and even as late as November 8, 1897, at Mesilla (Barber). Specimens have been taken by Charles Springer in Colfax County.—W. W. COOKE.

NEST.—In colonies, a hollow in the sand or in tall grass or weeds in marshy places or near alkali sloughs, lined with grass or weed stems. *Eggs*: 3 to 4, pale olive or buffy clay, thickly spotted with chocolate or black, and lavender or gray.

FOOD.—Rootlets, seeds, and vegetation amount to over a third of the food, while water boatmen, beetles, including weevils, crane flies, gnats, and larvae and pupae of alkali flies are the most important items in the animal food. The stomach of one downy young only a few days old contained 8 or more small water beetles, 1 Jerusalem cricket, 1 dragon-fly larva, 1 small bug, and 1 centipede.

GENERAL HABITS.—As Mr. Henshaw wrote, numbers of American Avocets are "still to be seen along the borders of sloughs and ponds in the far West, though even there the bird by no means enjoys the

immunity from persecution that it deserves." Speaking of its remarkable adaptations, he writes: "Its slender, upward-curved bill may well excite wonder, but Nature knew what she was about in designing it, for its form admirably adapts it for finding and seizing any prey that may rest on the surface of the muddy ooze, or for probing for various larval forms common in fresh water" (1915, p. 147). In feeding, Doctor Chapman says, it lowers its bill till its convexity touches the bottom, and then moves rapidly forward, with every step swinging its bill from side to side as a mower does his scythe. It nests on the margins of the ponds which it frequents, and no sooner does an intruder appear than it flies to meet him with a loud *plee-eeek* that unmistakably betrays the secret it is so anxious to conceal.

When studying the Avocets, Mr. Bent says, "they fooled us frequently as to the location of their nests by squatting on the bare ground as if sitting on their eggs, and then flying off yelping at us if we drew near. They were very much at home in the water, swimming lightly and gracefully, and feeding in the shallow water by dipping their heads under, like the surface-feeding ducks." In May, during courtship, he tells us, "they danced along the shore or waded in the shallow water holding their wings fully extended, tipping from side to side, as if balancing themselves. Sometimes they would run rapidly along, crouching close to the ground, frequently nodding or bowing, and sometimes they would lie flat on the water or ground, with wings outstretched as if in agony (1907, p. 425).

A remarkable mass movement—milling—of probably a hundred and fifty Avocets on a small round island, was witnessed by Mr. C. E. H. Aiken in Utah.

The soft colors of the Avocets tone in well with the pale tints of the alkali plains they frequent, but during one of their fall migrations we found Sandpipers, Plovers, Willets, Black-necked Stilts, Curlews, and Avocets taking advantage of the food to be found in the green irrigated fields of the Bolles Ranch at Carlsbad. The two Avocets that Professor Merrill found spending the summer at Mesquite Lake feeding along shore or in the shallows, were equally social and when wading around among a flock of ducks, if alarmed would rise with them wheeling and turning in unison till the whole flock lit again.

In spite of being a conspicuous object in the landscape, we may now hope to keep this remarkable bird with us, for as Mr. Henshaw writes, "the Avocet, so innocent and so beautiful, is now protected by the Federal law and, as its flesh is worthless, neither sportsmen nor gunners have any excuse for slaughtering it" (1915, p. 147).

ADDITIONAL LITERATURE.—AIKEN, C. E. H., and E. R. WARREN. The birds of El Paso County, Colorado, Part I, 485, 1914.—BENNETT, W. W., Bird-Lore, XXVII, 86-91, 1925 (nesting).—GRINNELL, BRYANT, and STORER, Game Birds of California,

337-344, 1918.—HERSEY, L. J., and R. B. ROCKWELL, Condor, XI, 115, 1909 (nest).—PEARSON, T. G., Educational Leaflet 88, Nat. Assoc. Audubon Soc.—ROCKWELL, R. B., Condor, XIV, 123-125, 1912 (nest).—SAUNDERS, A. A., Condor, XVI, 130, 133, 1914 (nest).—TYLER, J. G., Pacific Coast Avifauna, No. 9, 24-25, 1913.—WETMORE, ALEXANDER, U. S. Dept. Agr. Bull. 1359, 12-16, 1925.

BLACK-NECKED STILT: *Himantopus mexicanus* (Müller)

PLATE 28

DESCRIPTION.—*Length*: 13.5-15.5 inches, wing 8.5-9, bill 2.5, tarsus 4. Bill nearly straight, slightly upcurved; wings and legs very long, tail short; hind toe wanting, front toes slightly webbed. *Adult male*: *Upperparts glossy black* with greenish reflections except for white of lower back, rump, and upper tail coverts, and brownish tail; face, spot above eye, and *underparts white*, foreneck and breast flushed with pink in breeding season; axillars white, *wing linings black*; bill black, iris, legs and feet lake red or rose pink (in life). *Adult female*: Like male but back and shoulders grayish brown and black duller (not metallic). *Young in juvenal plumage*: Like the adult female but duller, upperparts and wing linings marked with buffy or whitish.

RANGE.—Breeds from Oregon, Utah, Colorado, Louisiana, and Florida south through the Bahama Islands, Cuba, and Porto Rico to Venezuela and Peru, also in Tamaulipas and California; winters from southern Lower California and southern parts of Texas, Louisiana, and Florida (rare in North Carolina), in Porto Rico and presumably throughout most or all of its breeding range in Central and South America (Bent, 1927).

STATE RECORDS.—The valleys of the Rio Grande and the Pecos seem to be the only places in New Mexico where the Black-necked Stilt has as yet been noted breeding, but since the species breeds at the alkali lakes of the San Luis Valley in southern Colorado, it is probable that it also nests at similar lakes in Rio Arriba County, New Mexico. The breeding range extends across the State from the vicinity of Las Vegas (Mitchell) to Los Pinos (Coues) and Carlsbad (Bailey). During the summer of 1913 it was found nesting at Clark Lake near Carlsbad June 25; at a small alkali lake near Roswell June 27; and at the mouth of Salt Creek, 15 miles above Roswell—a nest with eggs—June 28 (Ligon). Three birds were seen at Mesilla, July 11, 1913 (Merrill), one at Pecos, 7,000 feet, July 19, 1901 (Bailey), and one at Beaver Lake, 7,500 feet, August 26, 1908 (Bailey). It has been noted in the fall in the Jornada as late as September 25, 1905 (Ligon).

When Coues crossed New Mexico in 1864 he found it abundant, but of late years it has decreased decidedly in numbers. [While not common, it is fairly well distributed in summer and in migration, was nesting in the Pecos Valley and east—1916-1918. Between Socorro and Albuquerque, in 1917, ten were seen August 28, and two, September 4. On June 1, 1924, at least ten pairs, most of them no doubt breeding birds, were found on some shallow but permanent lakes near the Pecos River, about two miles east of Dexter, Chaves County. One nest with four eggs was located. On May 12, 1925, five nests with eggs were located at the same place, and a dozen or more pairs of nesting birds seen. On May 14, 1925, between 30 and 40 birds were seen at Willow Lake, about 20 miles south of Carlsbad. Six nests with eggs were located (Ligon). On June 5, 1921, a female was taken on an irrigation pond in the Mimbres River, 30 miles southeast of Silver City (Kellogg). At Lake Burford, four were found on the north shore on May 30, 1918, but they passed on at once (Wetmore).]—W. W. COOKE.

NEST.—In colonies, often on muddy islands in ponds or in flooded fields, when they are merely hollows lined with a few weed stems; but also in the brush on the

margins of ponds, when they are well constructed to reach above the surface of the water. *Eggs*: 3 to 5, olive or buffy clay color, superficial markings deep reddish brown or brownish black, deeper ones gray or lavender; or olive-green spotted with chocolate.

Food.—Among the items of economic importance, weevils, bill-bugs that feed on corn, large numbers of grasshoppers, and considerable numbers of several species of predacious diving beetles, which prey upon the insect food of fish and so are counted a nuisance in fish hatcheries; also crawfish that injure dikes; brine shrimps, the larvae and pupae of alkali flies, and mosquito larvae. "They should be protected and encouraged generally" (Wetmore).

GENERAL HABITS.—The spectacular Black-necked Stilts have what has been pointed out as the conspicuous recognition pose by other shore-birds and gulls, their long black, pointed wings being held high over their backs a moment on alighting, when they can be seen from a distance. The wings are also held up sometimes when they are chasing insects, as it is suggested, to make quick turns and tacks. The apparently disproportionate length of the extremely slender, stilt-like legs, though appearing useless on land, Doctor Wetmore points out, "come in good play when the birds wade in the shallows. It is there they seek their food, walking about in water at times nearly up to their bodies" (1927b, p. 376). Their intelligence in increasing the height of the nest to keep it from being flooded by rising water has placed them in the first rank of water birds, if they are not absolutely unique in this practice. Their eggs are sometimes found in a nest with those of the Avocet.

They are among the most interesting birds of New Mexico and I shall not soon forget one seen near Carlsbad standing in pitiful helplessness with one of the long, pink legs, with which Nature endowed it, mutilated, dangling—crippled by some thoughtless passerby.

In southern California, when we had been watching the White-faced Glossy Ibises, a Black-necked Stilt flew in and lit, stilted up on its long pink legs with black wings raised over its black and white body. "It came out on the edge of the lagoon and ran up and down with a nervous, nasal *en, en*, making itself so conspicuous that we quickly arrived at a conclusion. As we advanced it was joined by five other anxious parents. And three pairs of Black-necked Stilts can make as much excitement as two hundred and fifty ducks! The whole disturbance, so far as revealed, was due to the fact that three half-grown young were running around trying to hide on a narrow grassy spit of land between the lake and the lagoon. One Stilt, in its calmest moments, is enough to occupy all one's attention, running along the shore with airily hinging legs, or wading out in the water on its long pink stilts. But when six anxious parents fly around you with long necks and long legs extended, distractedly crying *en, en*, or bursting



From Handbook of Birds of the Western United States.

BLACK-NECKED STILTS

Showing secant and raptive color pattern and recognition
wing pose and coloration

out into a loud harsh barking *kown, kown*, and after working themselves up draw on their imaginations for methods of decoy, were it not all done in such tragic earnest, they would indeed be laughably droll figures. Bending one knee and throwing back a long pink leg as if to get a better purchase, one would flap the opposite long black wing like the sail of a windmill till it almost touched the ground. Then, stiff-legged, the acrobat would tilt forward against the wind till it seemed as if its small stilted up body would surely tip over on its bill; and then again it would begin violently flapping its wings at its sides. Or one of the droll birds would merely run along the beach eloquently shaking its wings" (1917b, p. 157).

ADDITIONAL LITERATURE.—BRYANT, H. C., Condor, XVI, 221, 226, 1914 (nest).—CHAPMAN, F. M., Camps and Cruises of an Ornithologist, 288-289, 1908.—PEARSON, T. G., Educational Leaflet 89, Nat. Assoc. Audubon Soc.—TYLER, J. G., Pacific Coast Avifauna, No. 9, 25-29, 1913.—WETMORE, ALEXANDER, U. S. Dept. Agr. Bull. 1359, 16-20, 1925.

PHALAROPES: Family Phalaropodidae

The three Phalaropes resemble Sandpipers but have dense duck-like plumage and lobed or margined toes for swimming, as they live largely on the water. The female, who is large and more brilliantly colored than the male, proves the rule of sexual coloration by doing the courting and selecting the nesting site but leaving the less conspicuously marked male to incubate the eggs.

REFERENCE.—WETMORE, ALEXANDER, U. S. Dept. Agr. Bull. 1359, 1925 (food).

NORTHERN PHALAROPE: *Lóbipes lobátus* (Linnaeus)

DESCRIPTION.—*Length*: 7-8 inches, wing 4-4.4, bill .8-.9, tarsus .7-.8. Bill very slender, straight, legs short, toes with scalloped membranes. *Adult female in breeding plumage*: Upperparts, including wings, tail, and sides of breast, mainly slaty, with buff or tawny stripes making a V on back, rump white, wings with white stripe (in all plumages), axillars, most of wing linings, and median underparts white, neck and chest largely rust-red, contrasting strikingly with white throat; eyes brown, with broken white eye ring, bill black, legs and feet grayish. *Adult male in breeding plumage*: Similar to female but slightly smaller and much duller, face largely white. *Adults in winter plumage*: Upperparts chiefly gray, darker on head and with blackish ear patch; rest of head and underparts white, brown neck patch and V of back replaced by white. *Young in juvenal plumage*: Like winter adults, but upperparts darker, feather margins buffy or rusty, foreneck and chest suffused with brown; legs and feet bluish flesh color.

RANGE.—Old and New Worlds. Breeds in arctic regions of both hemispheres. In North America breeds from arctic coasts and islands of Alaska, Mackenzie, and Keewatin, and in central Greenland south to Quebec, Hudson Bay, southern Mackenzie, and southern Alaska; winters at least along the coast of Peru; of casual occurrence in the interior of the United States and in Ecuador and Argentina.

STATE RECORDS.—Breeding in the circumpolar regions and wintering far south of the equator, the Northern Phalarope crosses New Mexico as a rare visitant in both

spring and fall migration. Henry says: "The only occasion of my meeting with this species was in May, 1855, on the Rio Bonita, at the present site of Fort Stanton. I met a large flock in full summer plumage, and secured a number of them" (1859, p. 108). Several were seen at Beaver Lake, August 26-27, 1908 (Birdseye), and one August 31, 1903, near Las Vegas; also, phalaropes supposed to be this species were seen, two on Horse Lake, September 23, 1904, and eight (three in one flock, five in the other) on the Burford Lakes, September 28. They were not seen after the 29th (Bailey).—W. W. COOKE.

Food.—In 155 stomachs examined, vegetable matter—rootlets and seeds of aquatic plants—made only 2.8 per cent; animal food, 97.2 per cent, including crustacea such as small brine shrimps, and small mollusks including snails or other gastropods, water beetles and their larvae, weevils, winged ants, grasshoppers, dragon fly nymphs, crane flies, black gnats, the larvae, pupae, and adults of alkali flies, and *mosquito larvae* (28 stomachs examined contained 53 per cent mosquito larvae).

GENERAL HABITS.—In the fall migration, Brooks and Swarth report, Northern Phalaropes are common throughout British Columbia, being found "miles out to sea in huge flocks and in smaller numbers inland," and occurring "from the coast up to the highest Alpine lakelets" (1925, p. 40). At Mono Lake, California, they have been found in great numbers feeding on the alkali flies that mass along the water's edge and over the surface of the briny lake.

Slender little white-throated, gray-backed ones were seen at Lake Burford in the fall migration swimming rapidly about, twisting and turning as they picked their food from the surface of the water, in striking contrast to the big, dark, phlegmatic ducks and Coots by which they were surrounded.

During a spring migration of these beautiful birds at Monterey, Doctor Chapman found a large pond "fairly speckled" with them, and as he approached its margin "was not a little astonished to observe that apparently one-half of the Phalaropes in it were spinning about in the most remarkable manner. They might have been automatic teetotums. . . . The lobed feet were moved alternately in such a manner that the birds spun around in the same spot, making a complete revolution in about two seconds and from three or four to as many as forty turns without stopping. A rotary movement of the shallow water was thus created, bringing to the surface small forms of aquatic life which the Phalaropes eagerly devoured, their slender bills darting rapidly two or three times during each revolution" (1908, pp. 269-270).

In the Cape Region of Lower California most of the Phalaropes collected by Mr. Frazar had suffered mutilations of the feet or breast, probably caused by the bites of fishes (Brewster, 1902b, p. 59), which is suggestive in view of Abbott Thayer's theory of the need for protective water and sky coloration by gulls and terns which habitually sleep on the surface of the water.

The winter home of the Northern Phalaropes has long been supposed to be at sea off the coasts of South America, south of the equator, but

they have now been found by Dr. R. C. Murphy "common all along the coast of Peru." Not far off shore from Asia Island, the doctor's ship, the Alcatraz, "ran through many 'slicks' or grassy areas on the sea. They lay mostly between the drift-lines, and were themselves usually more or less flecked with suds and bubbles. These slicks proved to be the feeding grounds of flocks of Northern Phalaropes, aggregating tens of thousands of birds" (1925, p. 50). The flocks were often seen a mile or more off shore (Ibid, p. 281).

ADDITIONAL LITERATURE.—BREWSTER, WILLIAM, Bull. Mus. Comp. Zool., Harvard College, LXVI, 218-221, 1925.—CHAPMAN, F. M., Camps and Cruises of an Ornithologist, 268-271, 1908.—NELSON, E. W., Report on Natural History Collections made in Alaska, 99, 1887 (breeding habits).—TORREY, BRADFORD, Field Days in California, 49-57, 1913.—WETMORE, ALEXANDER, U. S. Dept. Agr. Bull. 1359, 4-8, 1925.

WILSON PHALAROPE: *Stegánopus tricolor* Vieillot

PLATE 29

DESCRIPTION.—*Male*: Length 8.2-9 inches, wing 4.7-4.8, bill 1.2, tarsus 1.2. *Female*: Length 9.4-10 inches, wing 5.2-5.3, bill 1.3, tarsus 1.3. Bill slender, longer than head, legs long, lobes of all the toes narrowly margined. *Adult female in breeding plumage*: Top of head bluish gray, nape white, "passing into bluish gray or slate-gray on back and scapulars" (Ridgway); side of head white with *black stripe*, *changing to reddish brown on lower neck* and sides of back; upperparts with broad brown Vs, and without white markings on back or wings but with *upper tail coverts white*; underparts plain white with cinnamon suffusion on sides of neck and breast; axillars and wing linings white; iris brown, eye-ring and patch above eye, white; bill, legs and feet blackish. *Adult male in breeding plumage*: Smaller; *color pattern only faintly indicated on head and neck*, back of neck reddish brown, upperparts mainly brownish streaked. *Adults in winter plumage*: Upperparts light gray, white feather tippings giving scale effect, upper tail coverts white; underparts mainly white; legs and feet yellowish. *Young in juvenal plumage*: Crown, back, and wings, dusky, the feathers edged with buff or rusty, and wings washed with whitish, giving streaked and mottled effect; stripe above eye and underparts white, neck tinged with buff; bill black, yellowish at base of upper mandible, legs flesh-color, feet yellow (Grinnell, Bryant, and Storer).

COMPARISONS.—The Wilson may be distinguished from other phalaropes by its larger size, long neck, long bill, white upper tail coverts, and, in all plumages, the absence of white wing bars.

RANGE.—Known only from the Western Hemisphere. Breeds probably from extreme southern British Columbia, Washington, Alberta, Saskatchewan, Manitoba, North Dakota, Michigan, and southern Ontario and south to Indiana, Missouri, Colorado, Utah, Nevada, and California; winters so far as known, from Brazil, Paraguay, Chile, and Argentina south to the Falkland Islands, but reported as wintering in Mexico, rarely southern Texas, and in southern California.

STATE RECORDS.—The Wilson Phalarope is such a common breeder in northern Colorado and so well known in migration in southern Colorado both east and west of the range, that it must necessarily be more common in New Mexico than the few records for the State would indicate. Two specimens were taken many years ago near Fort Thorn and sent to the Smithsonian Institution (Henry). On June 28,

1913, seven were seen at a newly filled lake, 25 miles north of Roswell (Ligon). A pair were seen feeding August 6, 1903, about the shores of a small rain lake on the summit of the Capitan Mountains at about 9,700 feet—2,000 feet higher than they usually range (Gaut).

The species has been recorded a few times in New Mexico in the spring, the earliest being April 8, 1913, when one was taken at Beaver Lake, 7,500 feet; five were seen at the same place April 29, and seven, April 26, 1915, at Mayberry Lake, about 60 miles west of Magdalena (Ligon). One was seen April 20, and another May 8, 1901, at Albuquerque (Birtwell), and one in April at Mesilla (Ford). At Chloride the first spring migrants noted were seen April 25, 1915, (Ligon). At Silver City a specimen was taken May 5, 1918, another, May 11, 1919, 25 miles southeast of Silver City (Kellogg). At Lake Burford a migrating flock of about 20, mostly males, was seen May 24, 1918, and at Hayden Lake, near by, a dozen were seen on May 27 (Wetmore).]—W. W. COOKE.

NEST.—Sometimes built over water but as a rule near sloughs with a fairly dry base in high grass, made of dead grass. *Eggs*: 4 to 8, gray and drab marked with brown and purple.

FOOD.—In 106 stomachs examined, the vegetable food amounted to only 6.7 per cent; the animal, 93.3 per cent. The vegetable food was almost wholly seeds of aquatic or marsh plants. The animal included crustaceans—3.6 per cent; aquatic bugs, including weevils, 24.4 per cent; beetles, 20.1 per cent; flies, 43.1 per cent, including crane flies, alkali flies, gnats, horse flies, and mosquito larvae. The "apparent predilection for mosquito larvae" is particularly important as it breeds on fresh-water marshes, where they usually abound.

GENERAL HABITS.—There is a rare charm attaching to this bird of water and sky—dainty, exquisite creature pausing on its long journey to alight on some clear pool where it may be seen with slender neck arched, its plump body riding the water with easy grace, touches of color adding richness and elegance to its beautiful form.

On the Phalarope's breeding grounds in the prairie sloughs, when stocky Red-winged Blackbirds fly excitedly over the marsh grass where their young are in hiding, overhead the long-winged, able-winged creatures of the air, with pale legs projecting beyond their white fan tails, fly back and forth crying softly *wek-wek-wek-wek-wek*, anxiously guarding the secret of their nest. For although the species conforms to nature's law that the more conspicuously plumaged member of the family does the wooing and the less conspicuous the brooding, the maternal instinct is strong in the breast of the female, and she joins her mate in expostulating with the invaders of their home.

At a roadside basin of water on the arid plain near Las Vegas—an artificial pond stocked with carp and posted against shooting—on the last day of August, 1903, we found quite an assemblage of appreciative birds, one Northern Phalarope, several Yellow-legs, and a flock each of Black Terns and Wilson Phalaropes, partly in breeding plumage. The Terns and Phalaropes flew back and forth from one end of the pond to the other, diving unconcernedly only a few yards from us. Sometimes they would point their bills down and plump in up to their



From Handbook of Birds of the Western United States

WILSON PHALAROPES

The large handsome female in the foreground shows the rich reddish neck stripe dulled in the smaller male at the left of the background

shoulders or farther; at other times, after scanning the water from above, they would drop lightly down, alighting on the surface in a sitting posture. Protected by the hunting signs they followed down the outlet close beside us, diving fearlessly within a rod or so of us, while we looked on admiringly.

ADDITIONAL LITERATURE.—BAILEY, F. M., *Condor*, XX, 64-68, 1918.—TYLER, J. S., *Condor*, XIX, 167-168, 1917.—WETMORE, ALEXANDER, U. S. Dept. Agr. Bull. 1359, 8-12, 1925.

GULLS AND TERNS: Family Laridae

GULLS: Subfamily Larinae

The plumage of the Gulls and Terns is long and dense on the breast, as they rest on the water. In the Terns the tail is forked; in the Gulls, mostly even or rounded. The sexes are alike, molting twice a year, and in breeding plumage may have bill, mouth, eyelids, and feet ornamented with red or yellow, the head black, or the breast pink. The immature take two or three years to reach the white adult plumage. Both Gulls and Terns nest in colonies on rocky shores, cliffs, drift, or beaches, and more rarely in trees. The young, though covered with down, stay in the nest for several days and are fed by their parents till able to catch their own food. Both Gulls and Terns are of value, not only as insect destroyers but as scavengers, especially about harbors and waterways.

REFERENCES.—BENT, A. C., U. S. Nat. Mus. Bull. 113, 1921.—COOKE, W. W., U. S. Dept. Agr. Bull. 292, 1915.—DWIGHT, JONATHAN, *Auk*, XVIII, 49-63, 1901; *Bull. Amer. Mus. Nat. Hist.*, vol. LII, Art. III, 63-401, 1925 (plumages, molts, distribution, etc.).—MILLER, R. C., *Condor*, XXV, 5-15, 1923 (flight).—THAYER, G. H., *Concealing-Coloration in the Animal Kingdom*, 72-75, 1909.

RING-BILLED GULL: *Larus delawarensis* Ord

PLATE 30

DESCRIPTION.—*Length*: 18-20 inches, wing 13.6-15.7, bill 1.5-1.7, tarsus 1.9-2.4. *Adults in summer plumage*: White except for pale gray mantle and black ends of wing quills; outside quill with large white spot near tip; iris yellow or cream color; bill yellow with black ring near tip; feet and legs yellowish or greenish. *Adults in winter plumage*: Head and neck (except chin, throat, and foreneck) streaked with brownish gray. *Young (first autumn)*: Upperparts brownish, the feathers margined with grayish buff; tail with wide dusky band and white tip; underparts white, spotted or clouded with brown laterally; naked orbital ring bluish; legs and feet grayish; bill dark, with flesh-colored base.

RANGE.—Breeds from southern Alaska, Great Slave Lake, Hudson Bay, and Labrador south to southeastern Quebec, North Dakota, southern Colorado, northern Utah, and southern Oregon; winters from Washington, possibly southern British Columbia, Montana, the Great Lakes, and Maine south to the Gulf Coast, Cuba, and southern Mexico.

STATE RECORDS.—Though breeding in southern Colorado near the State line, the Ring-billed Gull has not yet been detected nesting in New Mexico. (Immature,

apparently non-breeding birds were seen at Lake Burford, May 24 and 30 and June 5-7, 14, and 17, 1918 (Wetmore).] In fall, one was taken September 27, 1904, at Lake Burford (Bailey); several large gulls, probably this species, were seen September 15, 1905, at a large pond near El Rito (Hollister); and one at Thirteen-mile Lake, Chaves County, October 26, 1896 (Barber).

In winter, on the Carlsbad Bird Reserve, 300 were estimated January 1, 1915 [and 500 December, 1916 (Willet)].

A few were noted in migration along the Rio Grande near Fort Thorn in the early days by Henry, and a few gulls of undetermined species have been noted in recent years passing up and down the Rio Grande in spring and fall (Leopold). One was taken April 20, 1901, at Albuquerque (Birtwell); and one May, 1903, at Mangas Springs (Metcalf).—W. W. COOKE.

NEST.—In colonies, often on islands, on the ground, generally scantily lined with grass. Eggs: 2 to 3, clay-color, buffy or whitish, spotted with chocolate.

FOOD.—Dead fish, frogs, salamanders, crawfish, and small mollusks; insects and their larvae, especially locusts and grasshoppers, together with mice and other small rodents. In times of "mouse plagues" they do effective work in destroying the pests, and near towns do important work as scavengers. When McMillan Lake was drained in September, 1916, they did away with the fish left stranded by the receding water.

GENERAL HABITS.—The beautiful snowy and pearly robed gulls and terns are so familiar that we forget to ask why they are so differently clad from other birds that we know. A suggestive explanation has been offered by Abbott Thayer. As he points out, they have an "obliteratively disposed combination of soft water and cloud-like pearly gray, with bright shadow-absorbing white," which, whether flying or swimming, gives them "the greatest average inconspicuousness." On the other hand, their black wing markings shown in flight and displayed by holding up the wings for a moment on alighting, as in the case with plovers and sandpipers, make good recognition marks. As Mr. Seton points out, "all birds with ample wings and habits of displaying them, bear on them distinctive markings" (1897, p. 396), including not only the gulls and plovers, but hawks and owls, in contrast to birds like the hummingbirds, which move their wings too rapidly to be seen and so lack wing patterns.

The Ring-billed Gull, which formerly was one of the most widely distributed of gulls, Mr. Bent explains, "could never survive the eggging depredations which the Herring Gull has withstood successfully." It "yields readily to persecution, is easily driven away from its breeding grounds, and seems to prefer to breed in remote unsettled regions, far from the haunts of man," being now "mainly restricted to the interior, in the lakes of the prairies and plains of the Northern States and Canada" (1921, p. 132).

Highly gregarious, both on its breeding grounds and in its winter resorts, it congregates in large flocks of its own kind, associating also with a variety of others.



From Handbook of Birds of the Western United States

RING-BILLED GULL

A characteristic gull pose, the wings raised on alighting to show their striking black recognition marks

ADDITIONAL LITERATURE.—PALMER, R. H., Condor, XVIII, 115-122, 1916.—SETON-THOMPSON, ERNEST, Bird-Lore, 186, 1901.

LAUGHING GULL: *Lárus atricilla* Linnaeus

DESCRIPTION.—*Length*: 15-17 inches, wing 13, tail 5, bill 1.7, tarsus 2. *Adults in summer plumage*: Hood sooty gray, eyelid with white spot; mantle slaty gray; outer wing quills black, with or without small white apical spot; tail white; underparts white, breast flushed with pink in spring; iris brown, naked orbital ring and bill, dark red; bill with dusky tip or indistinct band; legs and feet dark reddish brown. *Adults in winter plumage*: Forepart and sides of head white, back of head spotted or mottled with brownish gray; bright colors of bill and feet obscured. *Young in juvenal plumage*: Upperparts light brownish, especially about the head, without sharply contrasting white; feather edgings buffy or clay-color; wing quills black, tipped with white; tail grayish with wide black band and white tip.

COMPARISONS.—The Franklin and Laughing Gull are similar and the young might be confused, but *atricilla* is uniformly browner, especially about the head, which lacks the sharp contrasts of the dark half hood and light face of *pepíxcán*. The tail band in *atricilla* is also narrower than in *pepíxcán*, and in *atricilla* both adults and immature have the ends of the wings extensively black.

RANGE.—Breeds on the Atlantic coast of the United States and the coasts and islands of the Gulf of Mexico and Caribbean Sea; winters from the coast of South Carolina to the northern coast of Brazil and the western coast of South America south to Chile. Casual inland in Canada and the United States as far west as Colorado and New Mexico (Dwight); recorded from Nova Scotia, after an "exceptional storm" (Taverner, 1927).

STATE RECORDS.—An inhabitant of tropical and temperate coasts, the Laughing Gull occasionally strays far inland. Such a wanderer examined by Coues in June, 1864, was taken at Fort Wingate, he says, "many miles from the nearest water of consequence"; though he adds, "it must have come up the Rio Grande" (Birds of the Northwest, 1874, 651).—W. W. COOKE.

GENERAL HABITS.—Nesting colonies of Laughing Gulls were formerly to be found along the salt marshes of the Atlantic coast from New England southward, but owing to persecution from eggers and plume hunters comparatively few colonies remain. All gulls and terns are protected by the Migratory Bird Treaty Act, and in most States they are protected by State laws, but the danger has been so great that some of the most notable breeding colonies have also been protected by wardens of the National Association of Audubon Societies.

ADDITIONAL LITERATURE.—DWIGHT, JONATHAN, Bull. Amer. Mus. Nat. Hist., LII, Art. III, 262-267, 1925 (plumage, molts, distribution, etc.).—MACKAY, G. H., Auk, X, 333-336, 1893 (habits in Massachusetts).

FRANKLIN GULL: *Lárus pepíxcán* Wagler

DESCRIPTION.—*Length*: 13.5-15 inches, wing 11.2, bill 1.3, tarsus 1.6. *Adults in summer plumage*: Hood slaty black, eyelid with white patch, neck white, mantle dark slaty; wing quills gray, tipped with white, the five outer ones with black subterminal spaces; tail white, underparts white, deeply tinted with pink in spring; iris brown, bill deep red, naked orbital ring, legs and feet dark red. *Adults in winter plumage*: Head mainly white but sides with contrasting dark patch and back of head streaked

with dusky; bill and feet darker red, bill tipped with orange-reddish. *Young in first winter plumage:* Forehead and underparts white, rest of head and back brownish, feathers edged with lighter; quills dusky, tipped with white; tail pale gray or white, with broad subterminal blackish band.

COMPARISONS.—The small size together with wing pattern distinguish this gull in all plumages, and in the adult the basal gray of the two central tail feathers is unique.

RANGE.—Breeds on "mid-continental lakes" in the prairie regions of the northern interior, from Alberta, Saskatchewan, and Manitoba south to South Dakota and Minnesota; winters sparingly on Gulf coast and west coast of Mexico, but mainly from Peru and Chile to Argentina. Recorded from Ontario and New Brunswick.

STATE RECORDS.—Franklin Gulls were found to be fairly common at Lake Burford during the spring migration of 1918—15-20 immature birds, molting into adult plumage, were seen June 11; about 20 more, June 13; and a flock of about 30 in full adult plumage June 14-16 (Wetmore).

NEST.—On broken-down rushes in shallow water, on bottom or afloat; made largely of grasses and rushes. *Eggs:* Usually 3, variable in size, shape, and color, buffy and greenish with brown and lavender markings.

GENERAL HABITS.—The Franklin Gulls are the familiar destroyers of insect pests in the northern interior, seen following the gang plows on the prairie, resting massed on points and sandbars along the shores of lakes, gathered in breeding colonies in tule marshes, and in migration maneuvering high in the sky.

A phenomenal concentration of gulls due to heavy rains, occurred in August, 1927, on the Cheyenne bottoms in Kansas. As the result, it is reported, there was a corresponding disappearance of grasshoppers and cut-worms on an area fifty miles in extent.

On the coast of Peru in winter, Doctor Murphy found the Franklin "an enormously abundant tourist from interior North America" (1925, p. 284).

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. Bull. 113, 163-175, 1921.—DWIGHT, JONATHAN, Bull. Amer. Mus. Nat. Hist., Vol. LII, Art. III, 288-293, 1925.—JOB, H. K., Educational Leaflet 44, Nat. Assoc. Audubon Soc.; Bird-Lore XII, 124-127, 1910; Among the Water Fowl, 159-166, 1902.—LEOPOLD, N. F., Jr., Auk, XL, 409-414, 1923 (change of migration route).—MILLER, OLIVE THORNE, A Bird-Lover in the West, 211-216, 1894.—ROBERTS, T. S., Auk, XVII, 272-283, 1900 (nesting).—TAVERNER, P. A., Birds of Western Canada, 58-60, 1926.

HEERMANN GULL: *Larus heermanni* Cassin

DESCRIPTION.—*Length:* 17.5-21 inches, wing 13.5, bill 1.5. *Adults in summer plumage:* Head white; underparts gray; back grayish brown, wing quills black, all but two or three outer ones tipped with white; tail black, narrowly tipped with white; iris yellowish, eye ring red; bill mainly or wholly bright red, legs and feet black. *Adults in winter plumage:* Similar to summer adults but head and upper neck grayish brown instead of white. *Young in juvenal plumage:* Entire plumage sooty brown, lighter below; wing and tail coverts tipped with grayish white; bill brown and black; legs and feet brownish black.

RANGE.—Breeds in Lower California and western Mexico; wanders north after the breeding season to the southern coast of British Columbia; winters from northern California to southern Guatemala.

STATE RECORDS.—[An adult male Heermann Gull in breeding plumage was found dead on Pinos Altos Mountain, nine miles north of Silver City, and brought to R. T. Kellogg, March 20, 1919. So far as known it is the first record for the State.]

SABINE GULL: *Xéma sáбини* (J. Sabine)

DESCRIPTION.—Bill gull-like, *tail with a rounded fork*. Length: 13-14 inches, wing 10.1-11.1, tail 4.5-5 (forked for about .6-1), bill 1, tarsus 1.2. *Adults in breeding plumage: Hood dark gray, bordered by black collar; back gray, upper tail coverts and tail white; wings tricolored, with strikingly contrasted gray front, white back, and black quills; underparts white, sometimes flushed with pink; iris brown, naked orbital ring red, bill black, tipped with yellow. Adults in winter plumage: Head and neck white, marked with dusky on ear coverts and back of head. Young in juvenal plumage: Most of head and mantle brownish, feathers tipped with buffy; rest of plumage mainly white but tail with wide terminal black band tipped with gray.*

RANGE.—Nearly circumpolar, breeding in arctic regions in North America, Europe, and Asia; in America from western coast of Alaska, northern parts of Mackenzie and Keewatin to northern Greenland; in migration on both coasts of United States and casually in the interior; winters in North America chiefly along the Pacific coast, casually and irregularly as far south as Peru.

STATE RECORDS.—Breeding in the Arctic region and wintering in South America, the Sabine Gull performs its extensive migrations for the most part along the coasts, but some wander across the interior and it has been taken in many States. The only record for New Mexico is that of a small flock seen by Birtwell, October 7, 1900, at Albuquerque (1901, pp. 112-113).—W. W. COOKE.

TERNs: Subfamily Sterninae

FORSTER TERN: *Stérna fórsteri* Nuttall

DESCRIPTION.—Length: About 14-15 inches, wing 9.5-10.3, tail 5-7.7, *forked for 2.3-5*; bill 1.5-1.6, tarsus .9-1. *Adults in breeding plumage: Top of head and nape wholly black; rest of upperparts, including deeply forked tail, pale gray; underparts wholly white; bill orange, tipped with black; feet and legs orange or orange red. Adults in winter plumage: Head white, with dusky stripe around eye and over ear; tail relatively shorter and broader; bill and feet duller. Young in first winter plumage: Like winter adults but upperparts washed with brown; tail feathers dusky terminally.*

RANGE.—Breeds on interior lakes from central Alberta, southwestern Saskatchewan, Manitoba, and southern Ontario south to Illinois, Minnesota, northern parts of Nebraska and Colorado, Utah, Nevada, California, and Oregon; also on coasts of New Jersey, Louisiana, and Texas; winters from California, Gulf coast, and South Carolina south to southern Guatemala; casual in Brazil; in migration on Atlantic coast north to Massachusetts.

STATE RECORDS.—The Forster Tern breeds locally across the whole of the northern United States and not rarely near Denver, Colorado. It is found in migration along the eastern foothills of Colorado and it is highly probable that some if not most of these individuals pass across New Mexico, but as yet there is no specimen on record for the State. It is, however, doubtless this species which Henry records as common in September on the Rio Grande and as having been seen in August, 1854, at Fort Thorn.—W. W. COOKE.

NEST.—In colonies, chiefly in grassy marshes but also on tule rafts, and on islands on the sand or among stones; a scant lining or a rude nest. *Eggs*: 3, very variable, olive-gray, brownish, or rarely white or buff, heavily marked with chocolate.

GENERAL HABITS.—The Forster Tern should be watched for over large bodies of water in New Mexico during the migrations. When too far away to distinguish its black crown and forked tail, it may still be recognized as a tern by its graceful swallow-like flight and its habit of flying over the water with bill pointed down. When it has located its prey, it darts down, plunging into the water and, it is said, when necessary actually swims a few feet below the surface. Its notes are given by Doctor Chapman as a "long-drawn, reedy cackle and a tweet-tweet-tweet-tweet" (Handbook).

ADDITIONAL LITERATURE.—HERSEY, L. J., and R. B. ROCKWELL, *Condor*, XI, 110, 111, 1909 (nest).—ROCKWELL, R. B., *Condor*, XIII, 57-61, 1911 (nesting).

AMERICAN BLACK TERN: *Chlidónias nígra surinaménsis* (Gmelin)

DESCRIPTION.—*Length*: 9-10.2 inches, wing 8.2, bill 1.1, tail 3.7, *forked for .9*, bill 1.1. *Adults in breeding plumage*: Head, neck, and underparts black, except for white under tail coverts; back, wings, and tail dark gray; iris dark brown, bill black



From Biological Survey (L. A. Fuertes)

FIG. 46. American Black Tern

The black-headed adult in the foreground shows the white wing border better than the white-headed young in the left of the background

suffused with deep red (Fuertes), legs and feet purplish. *Adults in winter plumage*: Foreparts and underparts white, head marked with dusky, black patch back of eye; upperparts bluish gray. *Young in first winter plumage*: Similar to winter adults but upperparts more or less washed with brownish, and sides and flanks tinged with gray.

RANGE.—Breeds chiefly in interior of North America from central Alaska, Great Slave Lake, northern Manitoba, Hudson Bay, and eastern Ontario, south to inland lakes of New York, Ohio, Missouri, Kansas, Colorado, Utah, Nevada, and California;

winters from Mazatlan, Mexico, along Pacific coast to Peru and Chile; in migration from Gulf of Mexico to northern South America along Atlantic coast.

STATE RECORDS.—The Black Tern is so abundant in the San Luis Valley of Colorado that it must necessarily be more common in New Mexico than the few records of its occurrence in that State would indicate. It will undoubtedly be found to breed around the lakes of northern New Mexico, but at the present time is known only as a spring and fall migrant. It was fairly common at Lake Burford, August 11, 1913, but the young were then full grown and there was nothing to prove that they had been hatched in the immediate neighborhood (Ligon). Two were taken August 28–29, 1903, at Loveless Lake (Gaut); two noted at Beaver Lake, 7,500 feet, August 26, 1908, and several seen August 31, 1903, over a pond near Las Vegas (Bailey); also a few noted September, 1854, on the Rio Grande near Fort Thorn (Henry). [One was seen June 1, 1924, at lakes about two miles east of Dexter (Ligon).

Three were seen in spring at Lake Burford June 6, 1918 (Wetmore). A flock of about 200 were seen on the Rio Mimbres 30 miles southeast of Silver City May 25, 1919 (Kellogg). At the lake of the Rio Grande Auto and Gun Club, June 16, 1919, 12 were seen (Ligon)].—W. W. COOKE.

NEST.—Usually in colonies, generally on floating rushes in shallow water of grassy slough or partly open marsh, sometimes on drift, an old muskrat house, or even the bare ground, made of cat-tails, reeds, or grasses. *Eggs*: 2 to 3, olive-brown, rarely whitish, heavily spotted and blotched with chocolate or black, often confluent about the larger end.

FOOD.—Instead of preying on food fishes, this Tern feeds extensively upon fish enemies, such as dragon fly nymphs, fish-eating beetles, and crawfishes. It also devours a great variety of insects, such as dragon flies, May flies, grasshoppers, locusts, predacious diving beetles, scarabaeid beetles, leaf beetles, click beetles, weevils, the moths of the cotton boll worm and fall army worm, gnats, and other flies, grubs and worms, so that it takes its place among the birds of decided economic value.

GENERAL HABITS.—So closely are the white terns associated with lake shores and sea coasts that the sight of this black-fronted Tern skimming swallow-like low over the ground far from water, or a flock following a gang plow, perhaps associated with Brewer Blackbirds, Grackles, and Franklin Gulls, startles by its apparent incongruity; but as the food list suggests, this strikingly marked water swallow—*Hydrochelidon* by one of its old names—spends a great deal of its time flying over prairie and plains, not too far from its marshy nesting ground, catching insects on the wing or in the grass to carry back to its young securely hidden among the tules. When they are fledged, a noisy brood may be seen occupying a row of roadside fence posts, their white heads showing dusky ear marks, while their parents with white spots already appearing in their black hoods fly slowly by, skillfully feeding the clamorous brood as they pass.

An experience in photographing Tern families in a small Saskatchewan colony, with nests in three feet of water, is interestingly described by Mr. H. H. Pittman in the *Condor*. The deep water chosen by the colony he assumes to be "to discourage wolves and other enemies." It might well have discouraged a photographer, but an old two-wheeled

buggy covered with burlap proved not only an original but most successful blind. On the way to it, however, he was attended by all the birds of the colony and constantly attacked by the owners of the nest he was photographing. In attacking, the Terns dropped their feet and struck his head with the bill. As "bird after bird hit the same spot," he confesses he was "glad to reach the shelter of the burlap." While one female was brooding "a small cloud of birds was passing backwards and forwards overhead all the time," but amid all the clamor he was surprised to find that she recognized the voice of her mate. Suddenly looking up expectantly she would become alert, and in a moment or two he would alight by the nest. The pair relieved each other in brooding at short intervals. One of Mr. Pittman's beautiful photographs shows a parent sheltering its young from the sun (1927, 140-143).

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. 113, 290-299, 1921.—CHAPMAN, F. M., Camps and Cruises, 324-329, 1908 (nesting).—JOB, H. K., Among the Water-Fowl, 166-168, 1902.—ROCKWELL, R. B., Condor, XIII, 61-63, 1911.—SETON, E. T., and F. M. CHAPMAN, Bird-Lore, VI, 15, 1904.—VAN ROSSEM, A. J., Condor, XXV, 208-213, 1923.

PIGEONS, DOVES, etc.: Order Columbiformes

PIGEONS AND DOVES: Family Columbidae

The Pigeons and Doves have the bill horny at tip, compressed, with a soft swelling near the base about the nostril; toes 4, 3 anterior generally cleft to base; rear toe, with few exceptions, at about the same level. The crop is large, secreting a milky fluid, which is regurgitated as food for the young; the gizzard is muscular, sometimes even horny or osseous. The Pigeons are monogamous, the male sharing in the care of the young.

"Some of the Pigeons and Doves are strictly arboreal, others as strictly terrestrial. Some seek the forests and others prefer fields and clearings. Some nest in colonies, others in isolated pairs, but most species are found in flocks of greater or less size after the breeding season. When drinking, they do not raise the head as most birds do to swallow, but keep the bill immersed until the draught is finished. . . . Both sexes incubate, the males daily period, so far as known, being from 10 a. m. to 4 p. m. The young are born naked, and are fed by regurgitation on predigested food, or 'Pigeon's milk' from the crop of the parent" (Chapman, 1912). "Doves and Pigeons are migratory and are protected under both State and Federal laws" (Ligon, 1927).

BAND-TAILED PIGEON: *Colúmba fasciáta fasciáta* Say

PLATE 31

DESCRIPTION.—*Length*: 15-16 inches, wing 8-8.8, tail 6-6.5. *Adult male*: Head, neck, and underparts mainly pinkish brown or vinaceous, *nape with white band* above



Western White-winged Duck

Illustrated by J. A. Rehn

WESTERN WHITE-WINGED DUCK

buggy covered with burlap proved not only an original but most successful blind. On the way to it, however, he was attended by all the birds of the colony and constantly attacked by the owners of the nest he was photographing. In attacking, the Terns dropped their feet and struck his head with the bill. As "bird after bird hit the same spot," he confesses he was "glad to reach the shelter of the burlap." While one female was brooding "a small cloud of birds was passing backwards and forwards overhead all the time," but amid all the clamor he was surprised to find that she recognized the voice of her mate. Suddenly looking up expectantly she would become alert, and in a moment or two he would alight by the nest. The pair relieved each other in brooding at short intervals. One of Mr. Pittman's beautiful photographs shows a parent sheltering its young from the sun (1927, 140-143).

ADDITIONAL LITERATURE.—BENT, A. C., U. S. Nat. Mus. 113, 290-299, 1921.—CHAPMAN, F. M., *Camps and Cruises*, 324-329, 1908 (nesting).—JOB, H. K., *Among the Water-Fowl*, 166-168, 1902.—ROCKWELL, R. B., *Condor*, XIII, 61-63, 1911.—SETON, E. T., and F. M. CHAPMAN, *Bird-Lore*, VI, 15, 1904.—VAN ROSSEM, A. J., *Condor*, XXV, 208-213, 1923.

PIGEONS, DOVES, etc.: Order Columbiformes

PIGEONS AND DOVES: Family Columbidae

The Pigeons and Doves have the bill horny at tip, compressed, with a soft swelling near the base about the nostril; toes 4, 3 anterior generally cleft to base; rear toe, with few exceptions, at about the same level. The crop is large, secreting a milky fluid, which is regurgitated as food for the young; the gizzard is muscular, sometimes even horny or osseous. The Pigeons are monogamous, the male sharing in the care of the young.

"Some of the Pigeons and Doves are strictly arboreal, others as strictly terrestrial. Some seek the forests and others prefer fields and clearings. Some nest in colonies, others in isolated pairs, but most species are found in flocks of greater or less size after the breeding season. When drinking, they do not raise the head as most birds do to swallow, but keep the bill immersed until the draught is finished. . . . Both sexes incubate, the males daily period, so far as known, being from 10 a. m. to 4 p. m. The young are born naked, and are fed by regurgitation on predigested food, or 'Pigeon's milk' from the crop of the parent" (Chapman, 1912). "Doves and Pigeons are migratory and are protected under both State and Federal laws" (Ligon, 1927).

BAND-TAILED PIGEON: *Columba fasciata fasciata* Say

PLATE 31

DESCRIPTION.—*Length*: 15-16 inches, wing 8-8.8, tail 6-6.5. *Adult male*: Head, neck, and underparts mainly pinkish brown or vinaceous, *nape with white band* above



WESTERN MOURNING DOVE

BAND-TAILED PIGEON

WESTERN WHITE-WINGED DOVE

metallic bronze or greenish patch; back and scapulars grayish brown, partly lustrous changing on wing coverts to slaty blue, these feathers partly edged with white, quills dusky; rump and base of tail gray, end of tail with light two-inch band, preceded by narrow dusky band; bill yellow tipped with black; iris pale yellow next to pupil, with outer ring of pink or lilac, eyelids red, legs and feet yellow (Ridgway). *Adult female*: Similar, but duller and grayer, yellow of bill and feet obscured. *Young*: Hind neck without white or metallic feathers, smaller wing coverts and feathers of chest tipped with paler; underparts grayish, tinged with brown on breast.

RANGE.—Transition Zone from southwestern British Columbia, Utah, Colorado, and western Texas south through Mexico and Lower California to Nicaragua; winters from southwestern United States south.

STATE RECORDS.—The occurrence of the Band-tailed Pigeon at any given place seems to vary in different years according to the food supply. This is especially true of the oak-covered mountain slopes which may swarm with the birds when there is a heavy crop of acorns and be entirely deserted during a whole year when the acorn crop is a failure. Although the species is usually found at medium altitudes, 6,000–8,000 feet, it wanders much higher in the fall. "Several small flocks were seen November 2–7, 1914, near Kingston, on the upper slopes of the Mimbres Range, above 9,000 feet (Goldman); they were noted July 28, 1903, at 10,000 feet on Pecos Baldy, and August 28, 1906, at 10,000 feet in the Jemez Mountains (Bailey); and a single bird still higher, August 18, 1905, near the summit of Mount Taylor (Hollister).

The breeding season is unusually long. [A nest with one well-incubated egg has been reported at the early date of April 23, 1922, 16 miles northeast of Santa Fe, at the remarkably high altitude of 10,500 feet, at the time well above the snow line (Jensen). It was nesting in late July and early August, 1908, among the oaks on the Animas Mountains at 5,800 feet (Goldman), three nests were found after the middle of August, 1901, in the Guadalupe Mountains (Bailey), [said to breed there (Ligon, 1927)], and nests have been found near Fort Webster at 6,500 feet (Henry). A nest with one egg was found June 3, 1913, at 8,000 feet in Monument Pass, Sierra County. [It was nesting commonly in the Black Range, north and northwest of Pinos Altos, the last of July, 1920, the nests containing both eggs and young. A few were seen in a canyon west of Elizabethtown, Taos Mountains, June 18 and 19, 1924 (Ligon). It breeds in the Pecos, Sacramento, and Sandia ranges (Leopold, 1919). In 1918 it was "fairly common in all of the high ranges, its abundance governed almost entirely by the abundance of mast." On June 27, 1919, three were seen near Hodges on Santa Barbara River, at 8,000 feet, and July 10–18, 1919, a few stragglers about Cowles (Ligon). In 1922 they were rare in the Sangre de Cristo Range but rather common in the Jemez Mountains (Jensen).] They were noted in 1913–14 in the Mogollon Mountains and on the Mimbres and Gila (Rock-hill).

On September 15–16, 1914, they were noted along the upper branches of Blue River Canyon to about 7,000 feet, six miles southwest of Luna (Goldman), and September 17, 1915, seen on Diamond Creek (Ligon); they were taken, November 10, 1914, 20 miles east of Silver City (Kellogg).

Winter records are scarce. They have been reported spending the year below 5,000 feet near Cliff, nesting in the oak draws (Bailey). [In a few instances they have spent the winter in the Black Range, being held there by the abundance of pinyon mast (Ligon, 1927).] They wintered in 1912–13, near Haut Creek, Socorro County at 7,500 feet (Ligon).—W.W. COOKE.

NEST.—Usually in scattered communities, a platform of twigs in trees, 8 to 30 feet from the ground, but eggs sometimes laid on the ground. *Eggs*: 1 to 2, white.

FOOD.—Mainly nuts, especially acorns, and berries, including wild currant, chokecherry, wild cherry, juniper, madrone, manzanita, raspberry, blackberry, elderberry, huckleberry, salmonberry, coffeeberry (*Rhamnus californica*), Christmas berry, and black gooseberry; wild grapes, flowers and leaf buds, sycamore balls, pine buds, seeds, and needles, and grain (mostly waste); together with grasshoppers and other insects.

GENERAL HABITS.—The Band-tailed Pigeon, with the remarkable yellow and pink eye, the largest of the New Mexico pigeons, delightfully associated with wooded canyons and oak brush slopes, is well named, for when in changing his course in flight or alighting on a tree, he spreads his square tail, the light band makes a conspicuous recognition mark. He is a bird of strong individuality and when off guard flies about among the nut pines and junipers around water holes flapping his wings loudly; and when calling from his nesting ground, he hoots like an owl.

Before hooting, Mr. Wales tells us, with neck stretched out and head bent down to a right angle, he opens his bill a crack and "gives one gasp which fills out the skin of his neck till about three times natural size, and at the same time utters a very faint *oo* which is not usually audible over twenty feet." Then follows the *whoo-oo* or hoot, which "is made by a quick expelling of the air from the bird's lungs. . . . The swelled neck skin is not reduced, as the bill is opened and the lungs are refilled for the following *coo*. There are usually about seven or eight of these hoots in a series, but sometimes as many as eleven. When finished, the pigeon brings his neck back into its natural position and allows the air to escape from under the neck skin (1926, p. 42.)

The roost of a small colony was found by Mr. Gaut in a grove of wild cherries in the foothills of the Capitan Mountains. The Band-tails would come in about dusk and fly away about sunrise. As they always came and went in the same directions they doubtless spent the day on some especially good feeding ground, and the examination of those shot showed that they had been eating green acorns, juniper berries, and wild grapes (MS). Two specimens examined in the Guadalupe Mountains had swallowed their acorns whole—in the cups—which demonstrates the astonishing grinding power of their gizzards. In Mineral Canyon, where the ground was covered with acorns, in October, 1915, Mr. Ligon saw from six to fifteen Band-tails every time he passed up the canyon. When pinyon nuts can be obtained, he says, the Pigeons feed almost entirely on them. In the fall, in the Sacramento Mountains south of Mescalero he found them feeding on elderberries—"twenty-four birds in a single bunch"—and he was told of much larger flocks about Cloudercroft at the same time. In the spring, however, one of the Taos Indians told us, the birds eat

pine buds and the soft tender needles. And in May, 1904, Sun-Elk reported, a flock of twenty-five or thirty came down from the canyons of the mountains near Taos to the threshing floors of the Pueblo, where they picked up the waste wheat and ate wild oats. A few were seen there as late as July 10. A number of flocks were reported to Sun-Elk from Arroyo Seco.

On August 10, 1904, a cattleman told me that the Band-tails were just beginning to come for acorns into the mountains north of Hondo Canyon, where he was running cattle, and on August 11, as we drove up the grade leading out of the canyon, we saw a flock of seven flying about the oak brush near the top of the wall, evidently gathering the acorns which were abundant there at the time.

On the west side of Moreno Valley, on July 4, 1919, Mr. S. E. Piper discovered that two or three thousand Pigeons had congregated along the borders of a deep cove. He was attracted to the place by heavy shooting on the part of the ranchmen—mainly foreigners who said that the birds destroyed their young grain, especially barley. On examining several areas from which the birds rose, Mr. Piper could find no indication that they were either digging or pulling the young grain; and barley found in the gizzard of one was old stained grain evidently gathered from the surface or about old stack or shock stands. It was evident that the hunters were seeking justification for shooting them, though several averred that they had found them unfit to eat! (MS).

"Although there is no open season for the hunting of these birds, Mr. Ligon says they do not appear to increase but remain in about the same numbers, an indication that they could not stand an open season in this State" (1927, p. 145).

Now that the Passenger Pigeon, which once flocked in hordes that darkened the sun, has been exterminated, especially wise guardianship should be accorded the remaining pigeons of the country that they may not meet a similar fate. The Band-tail's habit of flocking in sections affording a good food supply makes this a real danger, as has been already proved in California where unrestricted shooting came near resulting in its extermination in the State.

ADDITIONAL LITERATURE.—GRINNELL, JOSEPH, *Condor*, XV, 25-40, 1913.—GRINNELL, BRYANT, and STORER, *Game Birds of California*, 575-588, 1918.—WILLARD, F. C., *Condor*, XVIII, 110-112, 1916.

WESTERN MOURNING DOVE: *Zenaidúra macroura marginella* (Woodhouse)

PLATE 31

DESCRIPTION.—*Length:* 10.5-13.2 inches, wing 4.7-6.2, tail 5.7-6.5, bill .5-.6. *Tail elongated and pointed, bordered with white and black. Adult male:* Body brownish, pinkish fawn-colored below with iridescent blackish spots on side of head, back and wings; top of head washed with bluish, sides of neck glittering with iridescence; iris

dark brown; bare skin around eye bluish; bill black, angle of mouth, legs, and feet pinkish red. *Adult female*: Similar but paler and iridescence reduced. *Young*: Much duller than female, black ear spots and iridescence wanting and general tone gray; many feathers with whitish edging.



FIG. 47. Tail of Western Mourning Dove

RANGE.—Breeds chiefly in Upper Sonoran and Lower Transition Zones in interior British Columbia, Saskatchewan, and Manitoba south through the western United States and Mexico; locally in Guatemala and Lower California; winters from Washington (rarely) and southern Colorado, south to Panama.

STATE RECORDS.—The Western Mourning Dove breeds over most of New Mexico below 7,000 feet and occasionally somewhat higher as at McGaffy's Camp in the Zuni Mountains at 8,200 feet, June, 1909 (Goldman); Tres Piedras, 8,000 feet, July 11–19, 1892 (Loring); [Santa Fe region, up to 8,000 feet in the yellow pines (Jensen, 1922)]; and at Chloride, nearly to 8,000 feet (Blinn). [On June 23, 1919, they were very abundant on the Little Rio Grande, 8 to 15 miles southeast of Taos, 7,300–7,500 feet (Ligon).] On August 8, 1920, Major Long's party, after following nearly the whole length of the Mora River, recorded the "dove" as having been noticed in all the country they had passed over (in James, 1823, vol. II, p. 97). [At Raton, June 25–28, 1916, three pairs bred on a 160 acre tract (Howarth). At Lake Burford May–June, 1918, they were abundant, breeding in the forested hills (Wetmore). In the Pecos Valley between Roswell and Fort Sumner in June, 1918, next to the Desert Horned Larks they were the commonest birds. Several nests with eggs were found June 17 and 18. "In 1926 they were more numerous than ever before observed in the State. They were extremely common in the lower and intermediate elevations and were abundant up to above 8,000 feet (Ligon).] The nesting season extends over a large part of the summer, for in addition to nesting early in the spring—eggs May 5, 1913, Chloride, 6,200 feet, [and May 7 and 8, 1920, Animas Mountains] (Ligon)—as is usual with other birds, they continue the egg-laying late into the fall, and even as late as September 9, 1905, were found sitting on eggs at Rio Puerco (Hollister). Anthony recorded a strange case of late nesting in the summer of 1886 at Apache in Grant County. "After the last of the spring migrants had disappeared, no Doves were seen about Apache nor in the adjoining ranges until August 20, after which they were very abundant; between August 25 and September 5, several dozen were shot for food and about eight out of every ten females contained eggs that would undoubtedly have been laid within the next day or two. On September 6 a nest was found with two eggs, which the parent was incubating."

During the fall they move up slightly into the mountains and were found above the pinyon pine belt in the San Mateo Mountains, August 7–20, 1905 (Hollister); up to 7,500 feet in Santa Clara Canyon in the Jemez Mountains, August 25, 1906; Lake Burford, 7,500 feet October 3, 1904, and Questa, 8,100 feet, August 15, 1904 (Bailey); [on September 12–October 8, 1916, they were still common on the open desert and at the lower edges of the cedar groves, in western New Mexico (Skinner)]; they were noted in Union County at Clapham, October 24, 1893, and later in many places (E. T. Seton).

Some remain in New Mexico during the winter, in fact they are not rare in the lower parts of southern New Mexico at this season. They winter regularly as far north as Hagerman in the Pecos Valley, Socorro in the Rio Grande Valley, and elsewhere throughout the southern part of the State (Ligon, 1927). They are common in winter at Mesilla (Ford); common, January 1–5, 1903, at Jarilla (Grant); in the lower country around Carlsbad were seen occasionally in January, 1915; were said

to be more abundant during summer and fall, but were noted during the winter of 1915-16 [in December, 1916 (Willet)]. A few winter rarely even to the northern part of the State as far as Santa Fe (Leopold, 1919)]; a few, Shiprock (Gilman); they were abundant January 23-25, 1894, Socorro (Loring). In central New Mexico they were very plentiful in 1907-1915 (Rockhill).



MAP 11. WESTERN MOURNING DOVE

Shaded areas show general breeding range, mainly in Sonoran Zones

In spring they spread all over the State, except in the high mountains (Ligon). They are recorded as arriving at Las Vegas, 6,700 feet, April 2, 1902 (Atkins), and at Halls Peak, 8,000 feet, April 20, 1895 (Barber). The high altitude of Halls Peak accounts for the late date of arrival, for by April 20, the earliest migrants have already arrived in southern Wyoming.—W. W. COOKE.

NEST.—Usually a frail platform of twigs, straws, dried grasses, weed stems, and rootlets on horizontal branches of low trees, as mesquite, cedar, hackberry, oak, or willow, but also in bushes and cactus, and in treeless regions on the ground. Eggs: 2, white.

Food.—In summer, mainly grass and weed seeds, as amaranth, filaree, cockle, pigweed, ragweed, thistle, smartweed, wood sorrel, spurge, pigeon-grass, wild sunflower, cleome, and croton, acorns, with a little waste grain, and also locusts and a few other insects, mostly ants. Professor Merrill wrote from Mesilla: "They take only fallen grain unless the shocks are left standing, in which case they may take the grain from the shock. Even then the damage here is negligible as far as noted" (MS). Large quantities of fine gravel are eaten, which help the muscular gizzard grind its seeds. Young in the nest are fed on "pigeon's milk," regurgitated by the parents.

GENERAL HABITS.—The Western Mourning Dove, recognized at a glance by its long pointed tail "narrowed to prevent friction" and its swift, musical flight, now lost to the people through neglect in many parts of its former range, is fortunately still abundant in parts of New Mexico. In Santa Clara Canyon late in August, 1906, we were glad to find the beautiful Doves in flocks, feeding on the seeds of the pink-flowered cleome; and in the juniper belt, feeding in the sunflower fields.

At Lake Burford in 1918, Doctor Wetmore says, "Pairs came down to water on the open beaches, or occasionally flew out and alighted upon floating masses of dead tules and walked down the edge to drink. Males were heard cooing and were seen in the short sailing flights, made with stiffly spread wings, characteristic of the breeding season" (1920a, p. 397).

Between Laguna and Magdalena in 1905 Mr. Hollister found them exceedingly abundant. During the day, he reports, "thousands were flushed from the weed and sunflower patches and at night hundreds would visit the water holes near camp" (MS). The daily flight to water, Mr. Leopold says, generally starts between three and four in the afternoon and if the distance is not too great reaches its height just before dark. The Doves are temperamental birds, he adds. On certain days they do not feed but gather in trees and just sit around, their weight actually being lessened by the emptiness of their crops. When scattered over the open mesas feeding on doveweed, a rainy day will interfere with their feeding, sending them to the lee side of bushes to keep dry. But although surrounded by wet vegetation from which they might seem able to quench their thirst, they make their regular evening flight to water. They can well cover considerable distances, as they have been known to fly over thirty miles an hour.

In the neighborhood of Mesilla Park, Professor Merrill reported that the Mourning Dove nested from river bank cottonwoods to mountain junipers, and on the McKenzie Ranch Mr. Ligon found nests in fruit trees one day, and on sun scorched ground by a yucca, the next. After the young are reared, the families tend to congregate in the large flocks reported by various observers. From Mesilla Park at midday in the tornillo bosques near water, Professor Merrill said, "one may

see thousands of these birds sitting quietly among the trees, resting in the shade after taking food and water" (MS). Those that live on the mesa or in the mountains where there is no water come to the valley to drink and feed. Twilight shows these returning flocks "cutting the high air at full speed, in a straight line for the mesa and mountains again" (MS). If followed to their roosting grounds on the mountains they may be found in the trees or bushes, and on the mesa they may be scared out of mesquites or from the ground under creosote and acacia bushes. In winter, Mr. Leopold says, they are nearly always found in loose flocks in wild sunflower patches.

Opportunities to study their interesting life histories are plenty, and should not be neglected as they give a clue to the lives of species less easy to observe. A study made by Mr. Craig on the expression of emotion in doves, calls attention to their movements and calls, as those given in alarm, in charging, when on the perch, and at the nest (1911, pp. 398-407).

Gentle and harmless, the lovely "Turtle Dove," as it is commonly called, is not only a bird of far flights but in its general distribution over the warm low country a bird of the every day life of the people, now whistling by from the sunflower patch to its nest in the orchard, now fluttering down into the solitary wayside camp to see what may be offered. Supplying a musical accompaniment to peaceful home life, whether of hackall, bungalow, or camp, in this way the voice of the softly cooing Dove bears a choice part in the beautiful sunny days of New Mexico.

ADDITIONAL LITERATURE.—BEAM, M. H., *Bird-Lore*, XXVII, 158-161, 1925.—GILMAN, FRENCH, *Condor*, XIII, 51, 52, 1911.—GRINNELL, BRYANT, and STORER, *Game Birds of California*, 588-603, 1918.—LEOPOLD, ALDO, *Condor*, XXIII, 19-21, 1921.—LINCOLN, F. C., *Auk*, XXXIX, 322-334, 1922 (bird banding).—MILLER, O. T., *A Bird-Lover in the West*, 194-204, 1894.—NICE, M. M., *Auk*, XXXIX, 457-474, 1922; XL, 37-58, 1923 (nesting).—PEARSON, T. G., *Educational Leaflet* 2, Nat. Assoc. Audubon Soc.—SNYDER, L. L., *Auk*, XL, 240-244, 1923 (nesting).—TALBOT, L. R., *Auk*, XXXIX, 334-350, 1922 (bird banding).

WESTERN WHITE-WINGED DOVE: *Melopelia asiatica mearnsi* Ridgway

PLATE 31

DESCRIPTION.—*Length*: 11-12.2 inches, wing 6.3-6.8, tail 4.8-5.2. *Tail rounded*. *Adult male*: Top of head and neck brownish with warm "bloom," sides of head with dark ear spot above golden-green iridescent patch; rest of upperparts mainly brownish except for bluish ash of lower back and rump, subterminal black band and white end of tail, *large white wing patch* and blackish quills; underparts fawn, fading to whitish; iris orange to red, bare orbital space blue, bill black, legs and feet lake red. *Adult female*: Similar, but usually slightly duller. *Young*: With white wing bar, but little or no purplish or iridescence or dark ear spot; feathers of upperparts with pale margins, and chest with pale shaft streaks.

RANGE.—Tropical and sub-tropical Zones from Lower California, southeastern California, southern Arizona, southwestern New Mexico, and southern Texas south to Mexico; casual in Colorado, a rare straggler in British Columbia.

STATE RECORDS.—The White-winged Dove is a common breeding bird of southern Arizona almost to the New Mexico line, and was found nesting at Mesilla in 1912 (Merrill). [June 20 to 24, 1926, it was found breeding commonly in the southern part of Hidalgo County. Many young were observed both in and out of the nest in Cottonwood Canyon, west of Cloverdale (Ligon).] A few that had apparently come up the Gila were seen by Mr. Fleming in the vicinity of Cliff in July and August, 1906; others that had apparently come up the San Francisco were seen at Glenwood by Charles Schafer in 1905-6 (Bailey); and they have also been reported as occurring sparingly in the small valleys opening into the Animas Valley from the Cloverdale Mountains (Goldman). A specimen was taken July 7, 1892, in the Guadalupe Canyon (Mearns); and one October 28, 1873, on the Gila River, in New Mexico (Henshaw); [a male was taken by Mr. Kellogg May 8, 1922, at Redrock, and ranchmen reported that they had appeared in the locality in the spring of 1921, though never noticed before that time. One was taken by Mr. Ligon, May 6-10, 1920, and others seen and heard between Culberson Ranch and San Luis Pass, among cottonwoods and ashes in a canyon containing water.] The species was reported many years ago from Santa Fe, and, though the report can not now be substantiated, yet it would not be surprising, since a specimen was taken in September, 1899, still farther north in the Wet Mountains of Colorado.—W. W. COOKE.

NEST.—In scattered colonies, in bushes and trees, a slight platform of twigs, often of mesquite leaf stems, from 4 to 26 feet from the ground. *Eggs*: Usually 2, white or creamy.

FOOD.—Small seeds, grain, berries, mesquite beans, cactus fruit, and insects.

GENERAL HABITS.—From Mesilla, Professor Merrill reported: "I have noted this species here only once, the summer of 1912. One pair nested in a poplar tree on the grounds of the College farm. The loud call, an arresting mixture of the Mourning Dove's soothing croon and the challenging hoot of an owl, first called my attention to the pair. The nesting began in late May and the parents were busy feeding the young by the middle of June. They were often seen in a nearby wheat field and feeding on mulberries that grew in abundance near the nest tree. I was away in July and when I returned the first of August the birds were not to be seen, nor did they return this year" (MS). In southern Hidalgo County, Mr. Ligon found the White-wings nesting in oaks and sycamores along timbered canyons.

Near the Gila River in Arizona, Doctor Wetmore found them nesting mainly in large colonies in dense tracts of mesquite, the largest colony, he estimated, containing at least two thousand pairs. "The birds maintained regular flights across country and gathered in flocks to feed, so that they were conspicuous figures in the bird life of the region" (1920b, p. 140.)

In southern Arizona, at our camp at the foot of the Santa Rita Mountains their loud calls were heard all day from the live oaks in front of the house, where they habitually nest. One was seen display-

ing as he gave his call, much as described by Bendire. Instead of inflating his chest pouter-pigeon style, as is done by the Band-tails, "he puffed out his throat, and, as if about to launch into the air, threw up his wings as some of the ducks do in courtship display of the speculum, showing the handsome white wing crescent; and at the same time curved up the rounded fan tail so that its white thumb-mark band showed strikingly—all this as he gave his loud emotional call—*kroo-kroo-kroo kru'*. A rather distant answering call suggested that he was displaying for a prospective mate. . . . When the call was given without the emotional display, it lapsed almost to monotony, being heard at camp all through the day. Some of the notes were heavily mouthed while others were muffled. The noise of the flight was volitional. One that I saw, puffed out his chest and started with whacking wings, soaring around, wings and tail spread; but shortly afterward it or another bird was seen flying by silently" (1923b, pp. 15-16).

ADDITIONAL LITERATURE.—GILMAN, M. F., Condor, XIII, 52-54, 1911.—WETMORE, A., Condor, XXII, 140-146, 1920.

MEXICAN GROUND DOVE: *Chamaepelia passerina pallascens* Baird

DESCRIPTION.—*Length: 6.5-7 inches* (Coues), wing 3.3-3.6, tail 2.7, bill .4-.5, tarsus .6-.7. Wings short and broad, tail short, nearly square. *Adult male: Back of head and entire neck bluish, feathers suggesting scales, rest of upperparts mainly grayish brown, tail mainly blackish; wing coverts with lustrous steel blue spots, inner webs of quills and under coverts chestnut or bright reddish brown, face and underparts pinkish, breast feathers brown centrally; iris orange red, bill coral or orange red, dusky at tip, legs and feet flesh-color or pink. Adult female and young: Similar, but duller; the young with whitish edgings to feathers.*

COMPARISONS.—Of the two small doves, the sparrow-sized Ground Dove is the smaller and has a short, almost square tail, while the Inca has a long, double-rounded one. In the Inca, the whole body is apparently scaled; in the Ground Dove, only the head and neck seem scaled. (See p. 306.)

RANGE.—Lower Sonoran and Tropical Zones from Lower California, southern California, southern Arizona, New Mexico, and middle southern Texas south to Costa Rica; casual in western California.

STATE RECORDS.—The only place in New Mexico where the little Mexican Ground Dove has been noted is at Mesilla. The earliest date was May 5 and in 1913 the species was seen until October 16 (Merrill).—W. W. COOKE.

NEST.—In a low tree or bush, particularly cottonwood, mesquite, willow, or prickly pear cactus, usually 2 to 6 feet from the ground, but sometimes on the ground; small, but compactly made of twigs or plant stalks, at times lined with a few straws. *Eggs: 2, white.*

FOOD.—Small seeds, refuse grain, and berries.

GENERAL HABITS.—Writing from Mesilla, Professor Merrill says the Mexican Ground Dove "is not common here, but I have seen several pairs at different places in the valley from May to September. I do not know if they stay longer. One specimen in the college museum

was taken August 15, 1902. The Doves are very tame and barely fly out of one's way. One pair was repeatedly seen in the streets and yards of houses in Las Cruces. Another pair was seen among the tornillos feeding with a half dozen Mourning Doves. Others were seen mostly along grain fields" (MS). They run along with quick short steps and graceful movements of the head. Their habit of holding the tail upright gives them quite a bantam-like appearance (Simmons, 1925, 89). Both parents incubate the eggs. It is to be hoped that these delightful, friendly little Doves may be found in other parts of southern New Mexico.

INCA DOVE: *Scardafella inca* (Lesson)

DESCRIPTION.—*Length:* About 8 inches, wing 3.7, tail 4-4.4. *Adults:* *Whole body apparently scaled:* upperparts grayish brown, tail brown and black, two outer feathers largely white, wing coverts largely chestnut; under wing coverts brown and black; underparts pale grayish pink, changing to buff on belly; iris dull orange to bright red, bill blackish, legs and feet flesh-color to carmine pink. *Young:* Similar but duller, upperparts mottled with pale grayish buffy.

RANGE.—Lower Sonoran and Tropical Zones from northeastern Lower California, Arizona, and southern Texas south to Guatemala.

STATE RECORDS.—An adult male Inca Dove appeared in Silver City, May 26, 1924, and remained there until taken by Mr. Kellogg on July 17, 1924. It was apparently the first record for New Mexico. A second specimen was taken by Mr. Ligon, June 17, 1926, 18 miles northwest of Lordsburg, Hidalgo County.

GENERAL HABITS.—The long-tailed, scaled Inca Dove, found so far in only two places in the State, should be watched for in the Lower Sonoran valleys of the southern part of the State, especially about towns and villages, as it is normally "strictly a bird of the towns." If heard outside, when not seen, however, the character of its notes may lead to its discovery. Its monotonous *coo-oo-coor*, or *who-oo-who*, repeated rapidly over and over, is very different from the soft, drawled *coo-oo-coo*, *coo*, *coo*, *coo* of the Mourning Dove. Its notes have a blowing quality, Mr. and Mrs. Swank say, and become louder and more insistent as the nesting season approaches (1928, p. 28).

PARROTS, MACAWS, PAROQUETS, etc: Order Psittaciformes

PARROTS AND PAROQUETS: Family Psittacidae

In the Parrots, the bill is hooked and used largely in climbing, the tongue is thick and fleshy and modified to make "a delicate tactile organ," used to some extent in prehension, and the peculiar developments of tongue and throat enable some of the group to articulate human speech. Their toes are paired, as in the Cuckoos and Road-runners.

THICK-BILLED PARROT: *Rhynchopsitta pachyrhyncha* (Swainson)

DESCRIPTION.—*Length:* 16-16.7 inches, wing 8.5-10.5, tail 6.3-7, graduated for 2.2-2.3, bill 1.4-1.5, height of bill at base 1.6-1.7. Bill very large and greatly compressed, tip of lower mandible elongated, cut off, and flattened; tail graduated

for about one third its length; cere densely feathered, concealing the nostrils. *Adults:* Green except for poppy red on forepart of head and wings, lemon yellow on under primary coverts, blackish spot before eye and blackish under surface of primaries and tail feathers; iris brownish red, bill, legs and feet black. *Young:* similar, but bill mainly whitish, and red restricted.

RANGE.—Northern part of Sierra Madre of Mexico; north casually to mountains of southern Arizona, and the Animas Mountains, New Mexico.

STATE RECORDS.—In 1919, Dr. Alexander Wetmore was told by R. Winkler that in recent years his son had at times seen parrots on Animas Mountain, above Deer Creek. This is the first New Mexico record of this most interesting bird, and it is a great satisfaction to be able to add it to the State list.

A confirmatory record was given Aldo Leopold by Forest Ranger Don S. Sullivan, who said that in 1917 some large Parrots were seen near the Elvey Ranch, Sec. 8, T. 33 S., R. 21 W., on the Animas Division of the Coronado Forest near the Mexican boundary.

In 1918 a pair of Thick-billed Parrots found in the Chiracahua Mountains of Arizona were purchased for the National Zoological Park at Washington, D. C. As the Superintendent, Ned Hollister, said, "This species is the only member of the order of parrots, excepting the almost extinct Carolina paroquet, known to occur within the United States. At intervals a number of years apart flights of Thick-bills appear in the mountains of southern Arizona, coming from Mexico. The birds obtained for the park were captured in January in the pine-forested Chiracahuas, when the ground in the higher altitudes where the birds occur was covered with snow" (1920b, p. 70)

CUCKOOS, ROAD-RUNNERS, etc.: Order Cuculiformes

CUCKOOS AND ROAD-RUNNERS: Family Cuculidae

The Road-runners and Cuckoos are alike in having two toes pointing forward and two back, but the feet of the Cuckoos, which are arboreal, are strictly for perching, while those of the Road-runner, which is terrestrial, are large and strong, for walking and running. Both are solitary birds with loud voices and curious calls. The eggs are laid at considerable intervals, so that eggs at different stages and young of different ages may be found in the nest. The young are hatched naked.



From Biological Survey

FIG. 48. Cuckoo (*Coccyzus americanus americanus*)

The white "thumb-marks" of the tail and the rufous wing patches shown in flight effectually mark the brown-backed Cuckoo

CUCKOOS: Subfamily Cuculinae

CALIFORNIA CUCKOO: *Coccyzus americanus occidentalis* Ridgway

DESCRIPTION.—*Length*: 12.3–13.5 inches, wing 5.5–6, tail 6.1–6.9, bill 1–1.1. Bill long and curved; tail long, rounded at tip. *Adults*: Upperparts grayish brown with faint green gloss; tail graduated, middle feathers like back, tipped with black, the rest blue-black tipped with broad white thumb marks; wing quills partly rufous; underparts white; iris dark brown, naked skin of orbital region gray, upper mandible black, basal two-thirds of lower mandible bright yellow. *Young*: Tail duller, white less extensive, the black not so pure, primaries and their coverts rufescent, naked skin of orbital region pale yellow.

RANGE.—Breeds in Transition and Sonoran Zones from British Columbia and Colorado south to southern Texas, Tamaulipas, Chihuahua, and Lower California; migrates through Costa Rica; winter home probably in South America.

STATE RECORDS.—The breeding range of the California Cuckoo includes the whole of New Mexico, but it seems to be a rare bird in the State and generally confined to the lower altitudes, although it has been seen up to 8,000 feet (Ligon). One was seen May 24, 1904, at Rinconada, and one taken at Espanola June 22, 1904, both places about 6,000 feet (Surber). [It is rare about Santa Fe, but one was seen, June 24, 1918, at the San Juan Pueblo, a wounded one was found June 18, 1919, and another bird June 5, 1922, at the Santa Fe Indian School (Jensen).] It was breeding at Roswell June 8–19, 1899 (Bailey); [observed rather commonly, June 1 and 2, 1924, at Artesia and Carlsbad (Ligon)]; and breeds at Mesilla (Merrill) and Elephant Butte (Ligon); a few were seen in summer at Forts Thorn and Fillmore on the Rio Grande (Henry); at Thornton June 30–July 1, 1900 (Jones). Most of these are, of course, breeding records.

On dates which may represent early fall migration they were seen at Socorro about the middle of August, 1909 (Goldman); Carlsbad early August, 1910 (Dearborn), and September 2, 1901 (Bailey). The latest at Mesilla was September 7, 1913 (Merrill). Many years ago a specimen was taken near Camp Burgwyn (Ridgway) at about 7,000 feet altitude, but there is no date to indicate whether this was a breeding or migration record.

In the spring, the earliest seen in 1913 near Beaver Lake, at 7,200 feet, was on May 22 (Ligon), and at Mesilla, May 28 (Merrill).—W. W. COOKE.

NEST.—In willow or mesquite thickets, cedar, hackberry, oak or other trees, a loose platform of twigs sometimes fairly well lined with mesquite or willow leaves or oak blossoms. *Eggs*: Generally 3 or 4, light blue or greenish blue, unspotted.

FOOD.—So largely hairy caterpillars that the inner coatings of the stomach are frequently completely furred. The contents of 110 stomachs of the Yellow-billed—of which the California is a subspecies—showed over 65 per cent caterpillars, over 14 per cent grasshoppers, crickets, and katydids, and over 12 per cent bugs. Among the caterpillars the destructive cotton worm and apple tree caterpillars were found, the cotton worm in 34 stomachs. The bugs included the periodical cicadas, and others injurious to oranges, melons, squashes, and other crops. With no objectionable habits, the Yellow-billed is one of the valuable allies of the farmer, destroying many serious agricultural pests.

GENERAL HABITS.—In Carlsbad on September 1 and 2 we saw what seemed to be a family of the long, slender brown California Cuckoos in a mulberry hedge by a pasture; and as they flew back and forth the rufous on the wing was shown in the down stroke and a turn of the tail revealed the white thumb marks directly. One of the birds shot

on September 5 had its stomach distended with three enormous grasshoppers.

At Mesilla Park, Professor Merrill found them eating fall web worms and stink bugs. He writes: "This Cuckoo is found anywhere in the valley where there is a dense growth of trees. Its preference seems to be dense bosques of tornillo, small cottonwoods, and willows. In such places it is heard rather than seen, unless one sits close out of sight and waits for the bird to come into sight. A slight disturbance and it slips from view without a rustle of a leaf. It is not very plentiful." Arriving the latter part of May it nests in June in small cottonwoods and willows, leaving for the south in September (MS).

In the nesting season, Mr. Shelton tells us, "the familiar 'kow-kow-kow' is forsaken for another note, a low guttural note, 'kuk-kuk-kuk,' always uttered by a brooding bird." One of the other notes of the breeding season, he says, "has a wonderful ventriloquistic power, and when heard at a distance of fifty yards, often seems to be half a mile or more away" (1911, p. 20). This note of the English bird is spoken of by Wordsworth as

"That cry which made me look a thousand ways
In bush, and tree, and sky."

The Cuckoo is so rarely caught sight of except as it passes swiftly and silently across an opening to hide away in the dense greenery, and its notes when heard so startle you with the revelation of its unsuspected presence, now here, now there, that it is no wonder the poet exclaimed—

"O Cuckoo, shall I call thee Bird, or but a wandering voice?"

ADDITIONAL LITERATURE.—BEAL, F. E. L., Biol. Surv., U. S. Dept. Agr., Bull. 9, 1898.—JAY, ANTONIN, Condor, XIII, 69-73, 1911.—MILLER, O. T., Little Brothers of the Air, 190-200, 1892.

ROAD-RUNNERS: Subfamily Neomorphinae

ROAD-RUNNER: *Geococcyx californianus* (Lesson)

PLATE 32

DESCRIPTION.—*Length*: 20-24 inches, wing 6.5-7, tail 11.5-12; eyelids lashed; bill decurved, feathers of crest and neck bristly, whole plumage coarse and harsh; tail long, graduated; wings very short; feet large and strong. *Adults*: Upperparts conspicuously streaked with brown and white, crest and foreparts of back glossed with steel-blue changing on lower back to lustrous bronzy green; upper tail coverts and middle tail feathers bronzy olive, glossed with purplish, outer tail feathers blue-black and green, tipped with white thumb marks; throat and belly whitish, chest streaked with black; iris yellow to orange, bare orbital space light blue anteriorly passing into bluish white beneath and behind eye, the posterior portion deep orange or orange-red; bill horn color, legs and feet pale bluish. *Young*: Similar, the iridescence developing with first feathers, but streaking less sharply defined.

RANGE.—Resident, mainly in Lower Sonoran and lower part of Upper Sonoran Zones in California, Utah, Colorado, Kansas, and western and middle Texas south through Lower California and tableland of Mexico to Puebla.



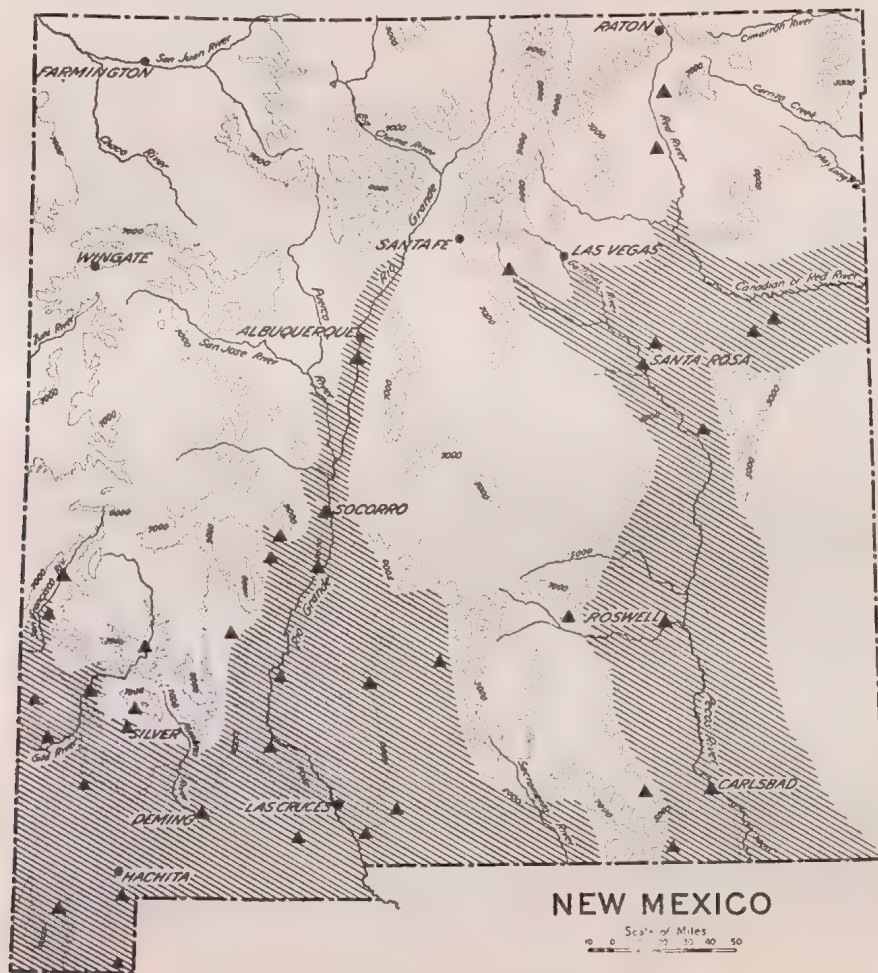
From Handbook of Birds of the Western United States

Fig. 49. Road-runner at Attention

STATE RECORDS.—The lower parts of southern New Mexico and the river valleys east of the Rio Grande constitute the principal resident range of the Road-runner in the State. It is probably most common in the lower Pecos near Carlsbad, but it is a fairly common breeding bird across the State in all the valleys below 5,000 feet. It ranges north to Montoya (Bailey); Clapham, October 29, and November 1, 1883, and Perico, December 19, 1893 (Seton); in Union County was common November 5, 1915; in Colfax County was seen in the foothills, August 17, 1913, and reported from the base of Tinaja Peak (Kalmbach); follows up the Pecos to 7,500 feet at Glorieta (Nelson); up the valley of the Canadian to about the same altitude at Halls Peak (Barber); up the Rio Grande to the vicinity of Santa Fe (Bailey); [quite common in northern Santa Fe County (Jensen, 1922)]; up the valley of the Gila to Gila (Goldman); and up the San Francisco River to Frisco, 6,200 feet (Bailey). [It ranges as high as 7,000 feet at the V+T Ranch on the East Gila River, and north to Aragon, in the western part; is also very common along the Rio Grande below Elephant Butte (Ligon, 1916).] In the mountains between the Gila and the Rio Grande, it occurs north to Silver City and on the east slope of the Mogollons to 7,500 feet at Chloride (Blinn). [One was seen, the latter part of November, 1917, near White-water Baldy, about 12 miles southeast of Mogollon, at approximately 9,500 feet (M. W. Talbot).] Eggs were taken at Silver City, April 8, about April 22 and on May 13, 1885, under such conditions as to make it probable that all three sets of eggs were laid by the same bird (Marsh). [On May 10, 1920, a nest with five eggs at different stages of incubation was found 10 miles south of Silver City at 5,800 feet. On May 6-10, 1920, it was observed from Silver City to the Mexican line. On May 18, 1916, a nest near Fair View was half completed. Between Magdalena and Socorro, five were seen, August 28, 1917 (Ligon).]

In the Guadalupe Mountains west of the Carlsbad Bird Reserve it was common at 6,500 feet altitude, in January, 1915; it was noted in the region in the winter of 1915-16 [and was common in December, 1916. On the Rio Grande Bird Reserve, it was common November 23-December 9, 1916 (Willet)].—W. W. COOKE.

NEST.—In cactus, yuccas, blue thorn, and buckeye bushes, or low trees, as mesquite, cedar, live oak, hackberry; a structure of twigs about a foot in diameter, well



MAP 12. ROAD-RUNNER

Shaded areas show main breeding range. Triangles mark special breeding and yearlong records

concealed in center of bush or tree, unlined or lined with roots, inner cedar bark, feathers, mesquite pods, manure chips, and sometimes snakeskin. Eggs: Usually 4 to 6, white or pale yellowish, unspotted.

FOOD.—Very largely grasshoppers and young crickets; also cicadas, spiders, beetles, cutworms, wire-worms, passion-vine and other caterpillars, bugs, ants, bees, and wasps, fly larvae, cocoons, centipedes, scorpions, tarantulas; snails, crabs, horned toads, lizards, snakes, rats, mice, young rabbits, small birds, and also seeds, cactus and other fruits.

GENERAL HABITS.—In the land of cactus and mesquite the grotesque Road-runner, the *paisano*, as the Mexicans call him, is a familiar sight. When trying to outrun your horse, his crested head is slightly raised, but his long neck, body, and long tail are held as level as a ruler, his powerful legs swinging rapidly over the road. His top speed, tested with an automobile, has been given as fifteen miles. In stopping, he throws up his long tail for a brake, and when his interest or curiosity is aroused stands at attention with neck craned forward, tail over back and legs firmly planted—a quizzical figure.

Professor Merrill says "it is a delight to watch the easy abandon with which [the Road-runners] trot along among the shadscales, lower the head in a flash and scoop a lizard down their capacious maw without the least slacking of their gaits" (MS). Sometimes the unique birds become very familiar. A pair was seen by Mr. Jensen at a ranch near Santa Fe, feeding with the chickens, and the ranchman told him that they came regularly for a "hand-out" and often went to roost in the poultry house (1923b, p. 457). They might be especially useful around houses, as one has been caught by Mr. Anthony red-handed from killing a wood rat (1896, pp. 257-258).

One found at Clapham by Mr. Ernest Thompson Seton, he tells us, "came running around the ranch house, behaving much like a magpie, pumping its long tail, behaving, as Coues says 'like half magpie, half chicken.'" Later "another came and enlivened the place, alternately as alert as a robin, then as posed as an owl. It hopped ten feet up onto the roof, apparently without effort or reason." A specimen brought Mr. Seton in December had its stomach crammed with grasshoppers. As he comments, "he must have worked hard to find them, for the winter cold and hard, but snowless, is on us" (MS).

Two Road-runners that we saw at Carlsbad on fence posts bordering an irrigation ditch, snapped their bills and chased each other up into a cottonwood on the bank where there were caterpillar nests. To determine what they had been eating, one was shot and its gizzard was found to contain not only caterpillar skins but a number of large grasshoppers, a large black cricket, beetles, a centipede six inches long, and part of a garter snake a foot long. The rest of the snake was down in the crop and the barely swallowed end up near the bill, suggesting Mr. Finley's droll photograph of his tame Road-runners standing with long, unswallowed lizard tails dangling from their bills while they waited for the process of digestion to relieve them (1923, pp. 186-187).

A pair that Mr. A. W. Anthony watched at Hachita "came regularly to one of the mines for water. . . . The visit was made at nearly the same hour each forenoon, and was eagerly looked forward to by a



From mounted group in Colorado Museum of Natural History

ROAD-RUNNERS WITH THEIR YOUNG

fox hound owned by one of the workmen. The dog never failed to give chase as soon as the birds were sighted, and the race was as much enjoyed by the birds as by the dog; they seemed to have no difficulty whatever in keeping well out of danger without taking wing, and usually found time during the chase to stop at the water hole and get their daily drink" (1892, p. 362). A less fortunate Road-runner was captured by a couple of dogs fresh from the chase of a wolf, Doctor Heermann tells us. "Hotly pressed, the bird would gain upon its enemies while sailing down the mountain slope, but taking to his feet on the first ascent, this advantage was again soon lost, and the fugitive, worn out, fell at length a victim to their relentless determination" (1859, p. 60). On hot days in summer, Professor Merrill found, the Road-runner often leaves the ground and flies up into high trees for shade (MS). But in the morning, Mr. Henshaw says, "It loves to meet the first rays of the rising sun, ascending for this purpose to the top of the mesquite trees, and, standing erect on the topmost branch, loosens its feathers, and appears to catch all the grateful warmth possible, remaining in this attitude for many minutes" (1875, p. 384).

In driving along between Glenwood and Cliff we were fortunate enough to see six of the usually solitary birds in one day—four chasing one another across a flat at the mouth of Duck Creek, and one, a few hours later, crossing the road ahead of us and after running up the hillside a few yards stopping unconcernedly to let us pass. In other places, as on the muddy bank of the Gila, we were pleased to recognize their curious tracks, tracks with two toes pointing forward and two toes pointing back, which some of the Indians imitate, encircling the tent of the dead to mislead malign spirits as to the course taken by the departed soul.

The notes of the Road-runner are as unusual as its figure and habits. In spring, Mr. Howard Lacey tells us, it "makes a loud chuckling crowing noise . . . and also a cooing noise that might easily be mistaken for the voice of some kind of dove; it also makes a sort of purring sound in its throat, *perrp, perrp, perrp*" (1911, p. 209). In the dove note, Mr. Bailey thinks, there is also much of the cuckoo quality.

One in southern Arizona on whose hunting grounds we camped for a winter, and which we called *Koo*, from its commonest note, became so friendly and familiar that we dubbed it our camp mascot.

At the Carlsbad cave, Mr. Bailey found characteristic stick nests "in the blue thorn and buckeye bushes down in the deep pit of the west entrance, as well as in some of the tall yuccas out on the ridges and along the bottom of the canyons. Occasionally one of these droll, long-tailed birds was seen close to the cave buildings and," he says, "on several occasions one came and peered into my cabin door, snapping its bill and making its low koo note" (1928a, p. 147).

In the Rio Grande Valley near Mesilla Park, Professor Merrill found the birds most numerous among the mesquites on the sand dunes and in tornillo bosques. They are resident and nest both early in the spring and as late as August, tornillo bushes being favorite places for their large stick nests. When trying to decoy a man away from the nest one of these original birds has been seen to simulate, not as is conventional a broken wing, but a broken leg!

In the mountains around Mesilla Park the Road-runners are found from the foothills up onto the rocky canyon walls, from which Professor Merrill saw one give what he terms "the most perfect example of volplaning" that one could see. "From a cliff a half a hundred feet high," he writes, "it pitched off with head, wings, and tail outstretched and glided down a canyon an eighth of a mile in the most gentle and graceful undulations imaginable, never flapping a wing once, not even when it alighted upon a rock, when it closed its wings, raised its head, and looked around with great unconcern" (MS).

ADDITIONAL LITERATURE.—ANTHONY, A. W., Auk, XIV, 217, 1897 (eating passion vine caterpillar).—BAILEY, F. M., Bird-Lore, XXIV, 260-265, 1922.—BRYANT, H. C., University of California Publ. in Zoology, Vol. 17, No. 5, 21-58, 1916 (habits and food).—FINLEY, W. L., and IRENE, Bird-Lore, XVII, 159-165, 1915; National Geographic Magazine, XLIV, 167, 186, 187, 201, 1923.—PEMBERTON, J. R., Condor, XVIII, 203, 1916 (decoy).—SUTTON, G. M., Bird-Lore, XVII, 57-61, 1915; Wilson Bulletin, XXXIV, 3-20, 1922.—TORREY, BRADFORD, Nature's Invitation, 163-166, 284-285, 1904.

OWLS: Order Strigiformes

In the Owls the sexes are alike, there is a facial disk with a rim outlining the face, and soft lax plumage which gives noiseless flight.

REFERENCE.—AVERILL, C. K., Condor, XXIX, 17-18, 1927 (emargination of primaries).



From Biological Survey

FIG. 50. Barn Owl

BARN OWLS: Family Tytonidae

The heart-shaped form of the facial disc has given the Barn Owls the descriptive local name of *Monkey Owls*. The head is without external ear-tufts, but the ears are very large. The legs are long, closely feathered, the feathers becoming thin and bristly on the toes; two toes turn forward, two back, the inner toe is as long as the middle toe, the middle claw is serrate on its inner edge, suggesting the pectinations of the goatsuckers. The wings are very long, folding beyond the end of the short tail whose outside feathers are the longest; the plumage is of peculiarly delicate, downy texture; the sexes are alike.

AMERICAN BARN OWL: *Tyto álba pratíncola* (Bonaparte)

DESCRIPTION.—*Length*: 14.7–18 inches, wing 12.5–14, tail 5.7–7.5, bill .9–1, tarsus 2.2–3. Female larger than male. *Adults*: *Upperparts tawny yellowish or brownish marbled with dusky and ashen*, giving a clouded, grayish effect, feathers (except wings and tail) with median black streak and white dot; wings and tail with a few dusky bands; facial disc and underparts varying from pure white to yellowish brown, dotted with black, facial border dusky; iris dark brown, bill yellowish. *Young*: Long creamy down is followed by adult plumage.

RANGE.—Extreme southern Canada, most of United States, Mexico, and Central America. Breeds mainly in Upper and Lower Austral Zones from Oregon, California, Utah, Colorado, Nebraska, southern Michigan, Ohio, New York, and Connecticut southward over whole of Mexico to eastern Central America (at least in winter) casually to Washington.

STATE RECORDS.—Although common to the west in California and to the east in Oklahoma, the Barn Owl is rather rare in the Rocky Mountain States. There is only one sure record of its nesting in New Mexico, young nearly feathered having been noted the middle of June, 1912, near Mesilla (Merrill), where the species had been seen at various times all through the year; but it is reported to breed in the Animas Mountains (Goldman).

One was taken September 2 about 1905 near Silver City (Hunn); [at Silver City (10 miles south) it was seen September 15, 1918 (Kellogg); at Santa Fe, one was seen September 14, 1926, on the Indian School campus (Jensen)]; and one November 9, 1855, by Capt. Pope's party at Dona Ana November 9, 1855 (Cassin).

Near the Carlsbad Bird Reserve, it was noted in January, 1915 (Willett). In May it was noted at Mangus Springs (Ford).—W. W. COOKE.

NEST.—In hollow trees, holes in banks, wells, mine shafts, in old crow or wood rat nests, or in belfries, towers, barns, or other buildings. *Eggs*: Usually 5 to 7, white.

FOOD.—Almost wholly mammals, including the pocket gopher, cotton rat, common rat, wood rat, meadow mouse, and house mouse; but also a few insects and occasionally a bird. "It is one of the most useful of birds and should be protected at all times" (Forbush).

GENERAL HABITS.—Like the hawks, the owls have the habit of ejecting the indigestible parts of their food, as the bones and fur, in the form of pellets, fur-coated and smoothly modeled to prevent injury to the mucous membrane. These pellets may be found around the nesting and feeding grounds, and some of those of the American Barn Owl were found at one time on the upper balconies of the State House in Denver, Colorado. They have also been found in one of the towers of the Smithsonian Institution in Washington, D. C. Upon examination, 1,247 of these pellets yielded 3,100 skulls, those of field mice, 1,987; house mice, 656, rats, 210, birds, 92, mostly sparrows and blackbirds, giving a total of 97 per cent mammals, 3 per cent birds (Henshaw, 1913, pp. 4, 26); testimony which goes to prove the Barn Owl "one of the most beneficial of rapacious birds." At Berkeley, California, Mr. G. L. Foster, by the examination of pellets found that in a year one pair destroyed 1,130 meadow mice, a total of 1,780 small mammals (1927, p. 246). The pocket gopher and ground squirrel,

two of the greatest pests of the West, are also eaten; while in the south the destructive cotton rat is fed on extensively.

At the State College, Professor Merrill once caught one of the Barn Owls in the attic of the Science building. It had come in at the front door, flown upstairs and through an open trap door into the attic (MS).

ADDITIONAL LITERATURE.—FINLEY, W. L., American Birds, 81-88, 1907; Educational Leaflet 14, Nat. Assoc. Audubon Soc.—FORBUSH, E. H., Birds of Massachusetts, II, 189-193, 1927.—HALL, E. R., Condor, XXIX, 274-275, 1927.—POTTER, J. K., and J. A. GILLESPIE, Auk, XLII, 177-192, 1925 (nesting).

HORNED OWLS, etc.: Family Strigidae

In the Horned Owls the facial disc is rounded, the eyes look forward, and in three genera there are ear-tufts or "horns." In some genera the ear conch is larger than the eye, and the ear parts more or less unsymmetrical, in certain cases making the whole skull askew; the inner toe is shorter than the middle toe, the middle claw not serrate, the outer toe is reversible as in Ospreys. Nearly all are woodland and nocturnal birds, preying on the small nocturnal mammals. As in the Barn Owls, their plumage is soft and lax, producing noiseless flight, and is characterized by bark and branch patterns that disguise them to their prey, which they catch in their sharp talons and generally swallow whole, ejecting the bones and hair in well-felted pellets. The sexes are colored essentially alike. Frequently the plumage is dichromatic, independent of sex or age, in one brood some being gray, others cinnamon or rufous. The nestlings are covered with whitish down.

MEXICAN SCREECH OWL: *Ótus asio cineraceus* (Ridgway)

PLATE 33

DESCRIPTION.—*Length*: About 6.5-8 inches, wing 6.1-7, tail 3.1-3.7. Skull and ear-parts symmetrical, ear-parts small, facial disc moderately developed, wings long, tail short, *toes feathered or bristled, ear tufts conspicuous*. Monochromatic. *Adults*: Upperparts *ashy gray*, with numerous conspicuous *blackish* shaft streaks; underparts with black vermiculations, cross lines and shaft streaks, without clear white interspaces; legs and feet thickly mottled with dusky; little trace of brown in plumage; iris lemon yellow, eyelids black, bill greenish. *Young*: Plumage narrowly cross-barred.

RANGE.—Upper Sonoran and Lower Transition Zones of southern California, Arizona, New Mexico, northwestern Mexico, and northern Lower California.

STATE RECORDS.—The Mexican Screech Owl is apparently confined to southern New Mexico. [Nests were found the first part of April, northwest of Fair View (Ligon, 1916-1918)]; the birds were heard calling in the foothills of the Capitan Mountains, in early June, 1899 (Bailey); two adults were seen July 1, 1913, at Mesilla (Merrill); one was taken May 17, 1913, near Chloride, 6,300 feet (Ligon); it was reported as a common resident at Silver City (Hunn); and an adult was taken July 13, 1892, on the west side of the San Luis Mountains (Mearns).

Outside of the breeding season, the species has been noted at Mangus Springs, January 16 (Metcalf), Silver City, January 20, 1915 (Kellogg), and as low as 4,000



Photograph by Robert B. Rockwell

SCREECH OWL (*Otus asio maxwelliae*)

Its gray color and bark-like markings make it easy to overlook the little owl in the doorway of its hollow-tree house

HORNED OWLS, ETC.: MEXICAN SCREECH OWL 317

feet at Redrock, September 24, 1908 (Goldman). In the late fall it seems to be rather common at the lower altitudes.—W. W. COOKE.

NEST.—In hollow trees, natural cavities, in scrub oak, etc., or giant cactus in abandoned holes of Gila Woodpeckers and Gilded Flickers, generally not far from the ground. *Eggs*: Usually 3 or 4.

FOOD.—Kangaroo rats, gophers, mice, rats, small birds, frogs, lizards, snakes, crawfish, scorpions, grasshoppers, locusts, and beetles. It is one of the most insectivorous of our owls.

GENERAL HABITS.—The small Mexican Screech Owl has the gray bark colors which it renders especially effective in times of danger by assuming protective attitudes. When one was surprised by Major Bendire, it was sitting on a limb near the trunk in a relaxed, drowsy attitude, but as soon as it caught sight of him, "it straightened up, sat very erect, with all its feathers pressed close to its body, making it appear nearly as long again, and it might then have been easily mistaken for a slender stump of the limb on which it was resting" (1892, p. 368). In addition to the old explanation of protective mimicry, Abbott Thayer brings forward the theory that by this contraction of its plumage, the "background pictures" of the owl are made clearest and sharpest, so helping to obliterate it.

The low quavering call of the Mexican Screech Owl, always heard with lively interest, may be caught in the night or at sundown when it is starting out on its day's work. Speaking of his Wheeler Survey experiences, Mr. Henshaw says, "Whenever our camp chanced to be made near one of the groves of oaks . . . these Owls were sure to be heard soon after dusk, and not infrequently, several would take up their stations in a tree within a few feet of the camp fire, and remain for an hour or more, apparently to satisfy their curiosity, uttering from time to time their low, responsive cries." They are very sociable in their disposition, he adds, and often "as soon as it is fairly dusk, the first call of a solitary bird may be heard issuing from some thicket where it has remained in concealment during the day. After one or two repetitions, this will be answered by another, perhaps half a mile away, and soon by a third and a fourth, apparently all coming together; and I have heard at least eight of these Owls, congregated within a short distance in the tree tops. When the band was complete they would move off, still apparently keeping together, till their notes were lost in the distance" (1875, p. 405).

ADDITIONAL LITERATURE.—ALLEN, A. A., *Auk*, XLI, 1-16, 1924 (life history and economic status).—DUTCHER, WILLIAM, Educational Leaflet 11, Nat. Assoc. Audubon Soc.—METZ, CHARLES W., *Condor*, X, 143-145, 1908.—ROCKWELL, R. B., *Condor*, IX, 140-145, 1907.—SETON, E. T., *Bird-Lore*, XXIII, 124-137, 1921 (bathing).—SHERMAN, A. R., *Auk*, XXVIII, 155-168, 1911.

AIKEN SCREECH OWL: *Ótus áasio aïkeni* (Brewster)

DESCRIPTION.—*Wing:* 6.5 inches, tail 3.8. Similar to the Mexican Screech Owl but larger, the upperparts more coarsely mottled or vermiculated and with blackish mesial streaks broader and more strongly contrasted with the general color; blackish pencilings of underparts heavier, rather less numerous (Ridgway).

RANGE.—Southern Colorado and northern New Mexico.

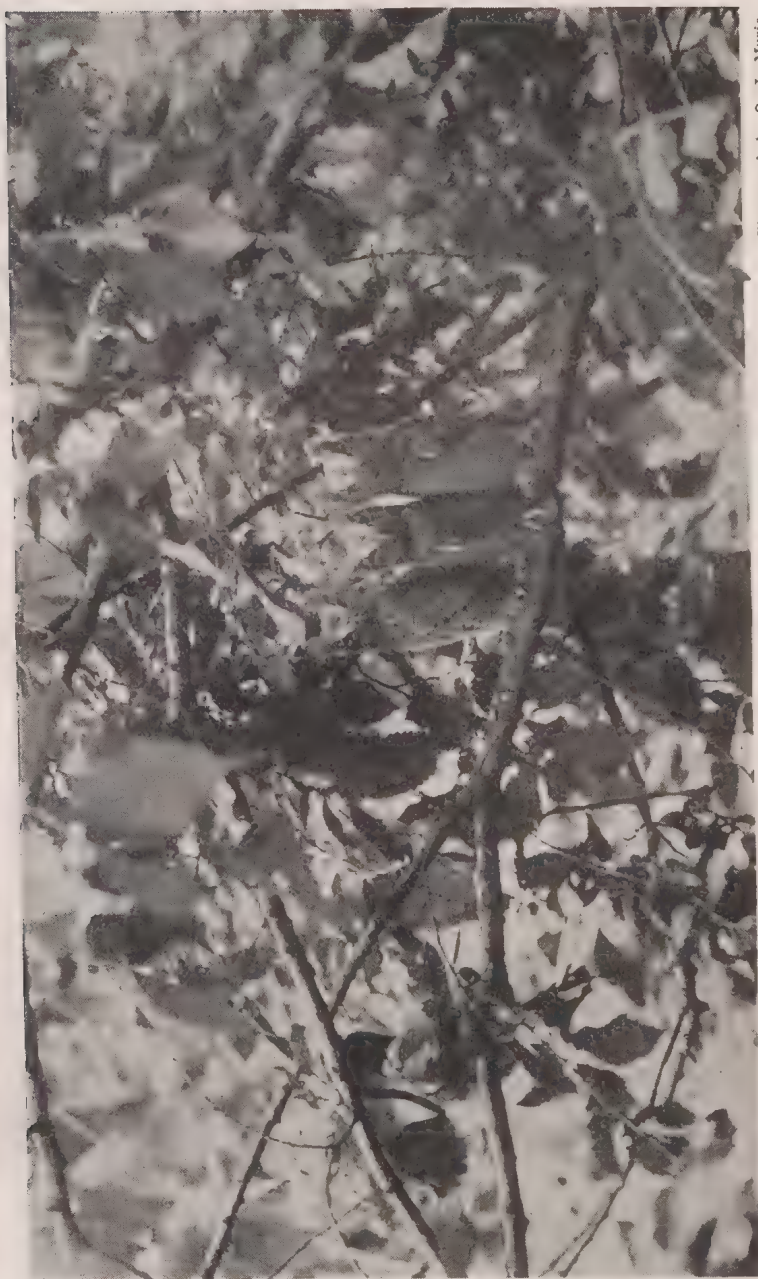
STATE RECORDS.—A male Aiken Screech Owl was taken by G. H. Gaut, September 29, 1903, at the ruins of Gran Quivira, on Mesa Jumanes, showing that there are two forms of *Otus asio* in New Mexico. As *aïkeni* is the breeding form of southern Colorado, it would naturally be the breeding form of northern New Mexico; *cinerascens* from Mexico being naturally the breeding form of southern New Mexico. This apparently being the case, the records have been confused, those given as the southern Mexican form from northern New Mexico being attributable to the northern-Aiken-form. Of these we have records of eggs taken at Fort Wingate, April 18, 1887 (Bendire); [a nest with nearly grown young in Santa Fe, May 15, 1921 (Jensen)]; young not long out of the nest seen near Taos Pueblo, July 14, 1904 (Bailey). And in the fall, September 15, 1903, noted as high as 8,800 feet in the Taos Mountains (Surber); [also noted in the winter of 1922-23, at 7,000 feet, Santa Fe (Jensen).]

FLAMMULATED SCREECH OWL: *Ótus flamméolus flamméolus* (Kaup)

DESCRIPTION.—*Length:* 6.5-7 inches (Coues), wing 5.1-5.6, tail 2.6-3. *Toes* entirely naked, ear-tufts short. *Dichromatic*, having red and gray phases, the red ones being rich buff or orange-rufous where the gray ones are brown or gray, but the peculiar color-pattern holding the same in both forms. *Adults:* *Facial disc*, sometimes whole head, *rusty brown*, speckled with black, and top of head also with white, tending to form a *white stripe over the eye*; upperparts finely dappled with brown and gray, and marked with "ragged" dark shaft-stripes; shoulders with a conspicuous white or tawny bar; underparts white, heavily overlaid with black shaft streaks or blotches, and irregular cross lines; *breast tinged with rusty brown*; tail with narrow "ragged" rusty or whitish cross bars; wing quills marked with white or buff; iris brown. *Young:* Plumage finely cross-barred, without longitudinal streaks.

RANGE.—Transition Zone from southern British Columbia, Washington, and Idaho, south through western Texas, Colorado, New Mexico, Arizona, and California, to highlands of Guatemala.

STATE RECORDS.—The rare Flammulated Screech Owl ranges from Colorado south to Mexico, hence it was to have been expected in New Mexico, but apparently it was not recorded for the State until Bergtold saw one October 3, 1906, in McKnight's Canyon in the Mogollon Mountains. Two years later on July 20, 1908, a specimen was secured in the Big Hatchet Mountains (Birdseye), and the next year on October 19, Bergtold again noted it in the Mogollon Mountains, this time on Iron Creek at about 7,200 feet. [One was found at Reserve, September 29, 1927 (H. H. Kimball); one collected May 8, 1920, at the north end of the Animas Mountains at 7,500 feet (Ligon).] The first eggs found in New Mexico were obtained in 1913 on June 3, at Haut Creek, 30 miles west of Chloride at 7,000 feet. [Incubated eggs were found under a sitting bird in the Carson Forest, June 6, 1916 (Ligon).] So far most of the records for New Mexico come from the middle altitudes in the mountains of the southwestern part of the State, but since the species has been taken in the Guadalupe Mountains of Texas (Bailey) close to the New Mexico line and along the front range of the Rocky Mountains in Colorado, there is every reason to expect that eventually it will be found in the mountains of eastern and northeastern New Mexico. [In 1922, Jensen reported that a pair had nested for five years in the Indian School campus at Santa Fe.]—W. W. COOKE.



Photograph by O. J. Murrie

FIG. 51. Three Young Screech Owls
In natural poses, bodies facing forward, but the left and middle ones with heads turned to look over their shoulders

NEST.—In woodpecker holes. *Eggs*: 3 or 4, white or creamy.

FOOD.—Small mammals, scorpions, beetles, and other insects.

GENERAL HABITS.—At home in the elevated plateaus of Guatemala and central Mexico and in the mountains of the southwestern United States, the little Flammulated Screech Owl has been taken in Estes Park, Colorado, at an altitude of probably 10,000 feet. Though little known, it seems to be strictly nocturnal and to differ little in habits from its relatives. Its call note, however, Dr. Joseph Grinnell says, is a peculiar one, a single mellow "whoot," repeated at regular intervals.

The nest found by Mr. Ligon thirty miles west of Chloride was in a canyon in a dead pine snag about forty feet high and its old woodpecker holes were occupied not only by the Owls but by a pair of House Finches and one of Chestnut-backed Bluebirds. In climbing the tree to examine the nests of the smaller birds, Mr. Ligon frightened the Owl so that she flew out of her nest hole, when he secured her, after which he climbed back to examine her nest. The entrance was about flicker size and went down about eight inches, beyond which a hole led to the center of the tree in which was the nest. The cavity was about ten inches deep and the nest was a collection of cottonwood twigs and bark and a few of the birds' feathers, on which lay two slightly incubated eggs.

The bird which Mr. Ligon collected in 1920 was at the time "sitting on the loose fine rock of a slide, under thick brush" (MS). On the Indian School campus at Santa Fe, Mr. Jensen found one sleeping in a peach tree in the orchard, and another dead under a light wire.

One found by Mr. H. H. Kimball in the San Francisco Mountains was roosting in a road-camp "garage, made out of upright pine poles roofed with galvanized iron," in which a three-ton truck was kept. As Mr. Kimball remarks, "evidently it had found the semi-darkened interior of the building a satisfactory resting place during the day" (1928, p. 129).

One of the little Owls that Mr. Willard photographed in Arizona sat within eight feet of him, presenting "a very comical picture . . . opening first one eye and then the other, like a sleepy child, in an endeavor to accustom herself to the glare of the bright sun" (1909c, p. 202).

PALLID HORNED OWL: *Búbo virginianus pallescens* Stone

DESCRIPTION.—*Male*: Length 18-23 inches, wing 13-13.7, extent about 49-52, tail 7.7-8.8, bill 1.3-1.4, weight about 3½ pounds. *Female*: Length 22-25 inches, wing 14-14.8, extent about 57, tail 7.8-9.3, bill 1.4-1.7. Ear-tufts large, feet densely feathered to claws. *Dichromatic: Light gray phase*. *Adults*: Facial ring black, collar white, plumage irregularly varied with buffy, tawny, whitish, and dusky;

upperparts mottled and vermiculated, grayish brown and buffy prevailing; tail and wing quills banded with dull brown; underparts white or buffy, mottled and barred with brownish, flanks buffy; iris bright yellow, bill dusky, legs and toes (feathered) buffy to nearly white. *Dark phase:* Blackish above, markings below blackish instead of brownish, the feet ochraceous and mottled. *Intermediate phase:* Yellowish brown predominating on face, body, and feet. *Young:* Following the nestling down, the coloration is more uniform than after the next molt, when distinctive markings appear.

RANGE.—From northwestern Lower California and southeastern California to Arizona, New Mexico, and central Texas south into northern Mexico.

STATE RECORDS.—The Pallid Horned Owl is found in extreme southern and western New Mexico. A nest with three eggs was found, March 11, 1916, on the Carlsbad Bird Reserve (Willett). [Downy young were found, March 25 and April 10, 1924, in the Carlsbad Cave region (Bailey)]; on April 20 (1904 or 1905), in a nest at Silver City (Hunn); and on the Middle Gila at 7,500 feet, April 12, 1913 (Ligon), which means that the eggs were laid early in March, which is probably about the average date for New Mexico. [It was commonly observed, May 6–10, 1920, between Silver City and the Mexican boundary, especially about the Animas Mountains (Ligon).]

After the breeding season, specimens were taken in the Animas Mountains, north slope, 5,800 feet, August 8, 1908 (Birdseye); at Redrock, September 24 and 28, 1908 (Goldman); at Liberty, October 30, 1908 (Birdseye).

In winter, a specimen was taken at Tularosa, December 25, 1902 (Gaut). In the Guadalupe Mountains, south of Queen, it was fairly common, December 31, 1915 (Ligon). On the Carlsbad Bird Reserve it was noted in January, 1915 [also noted in December, 1916; on the Rio Grande Bird Reserve one was seen, December 1, 1916 (Willett)]; a specimen was taken at Mesilla, 3,800 feet, February 24, 1903 (Ford); [another taken at Silver City, January 1, 1918 (Kellogg)].

NEST (of various species).—Sometimes 12 to 35 feet up in mesquite, oak, or hackberry, in an old nest of a crow or hawk, a hole in a large hollow tree, a cliff, cut-bank, or cave; occasionally on the ground, and one on a sleeper under a railroad bridge; variously lined with sticks, leaves, bark, moss, and their own feathers. **Eggs:** Usually 2 or 3, white.

Food (of various species).—When mammals are abundant, mainly ground squirrels, pocket gophers, prairie dogs, wood rats, kangaroo rats, mice of various kinds, rabbits, and other injurious rodents; but also birds, fish, snakes, lizards, horned toads, crawfish, scorpions, grasshoppers, cattle grubs, Jerusalem crickets, moths, large vinegarworms, many kinds of beetles, and other insects. When mammals are scarce, largely game birds and poultry, if poultry is left unhoused at night. When mammals are abundant, this large voracious Owl is "an important ally of the



From Handbook of Western Birds.

FIG. 52. Pallid Horned Owl

ranchmen in fighting the hordes . . . which infest his fields and ranges" (Fisher, 1907, p. 15).

GENERAL HABITS.—Two forms of the Great Horned Owls are found in New Mexico, the lighter, Pallid, extending north from northern Mexico; the darker Western Horned Owl extending south from Canada through the Rocky Mountain region. In their respective territories, they are found throughout the State, except at the higher altitudes, principally in canyons, cliffs, and caves, but also in dense timber and in large trees in the open.

The nests seem to be mainly below 8,000 feet, and many of the birds heard, below 7,000 feet; but late in the summer and early in the fall both old and young of the year are found high in the mountains.

Although there is great variation in the dichromatic plumage of the Great Horned Owls, the general color pattern gives it great advantage over its prey. While so large a bird, when seen in the woods, the pattern of its underparts—what Abbott Thayer terms horizontal branch barrings—like the crossbars of other birds of the forest tends to make it blend in with the network of bare branches; while the subtle, broken markings of wing and back suggest a "forest-vista" pattern; carrying the eye well on beyond the bird itself (1909, p. 41). From below, the ear-tufts, white collar, and wrist-spot are distinctive.

The molt of the Horned Owl seems to be late. One taken September 6, at about 8,500 feet was only beginning to molt, while another, taken September 26, 15 miles south of Acoma, was still largely in pinfeathers.

The large feathers of the Owl have been used by the Indians to decorate their arrows.

While the solemn, deep-toned *whó who whó who whó* of the Great Horned Owls heard after sunset and before sunrise from high trees or cliffs is a familiar camp sound, the strange shrill scream of the young owl, while equally characteristic, it is thought, is sometimes mistaken for the blood-curdling mysterious cry of the mountain lion. Although, like most owls, more often heard than seen, and though heard generally at night, Mr. Henshaw says the Horned Owl has excellent vision in the brightest hours of the day, and while caring for its young he thinks it hunts indifferently by day and night.

In Largo Canyon at sunset we discovered a *Bubo* sitting on a low dead tree as if watching for the cottontails and jack rabbits that abounded in the *Bigelovia* thickets; and by moonlight at our next camp others were heard hooting softly to each other.

At the entrance to the Carlsbad Cavern, at night Mr. Bailey heard "the deep toned *hoo, hoo, hoo, ooo,*" breaking from the quiet darkness of the great, high arched doorway. Within the cave, "far back at the brink of the Devils Den, beyond the last ray of outside light, a

complete skeleton of an Owl was picked up on the cave floor." In several less frequented neighboring caves the Owls were "nesting in high niches, well back in the gloomy twilight, safe from prowling enemies and safe from man as long as they would sit tight and not reveal their presence." One brooding mother outside the cave was "so protected by her mottled dress that when her big yellow eyes were shut she might well have passed for part of the cliff."

In another cliff nest, Mr. Bailey says, were "three snow-white downy young, only a few days old, with big, wobbly heads, blinking eyes, strong legs, and hooked claws, already useful in clinging to the nest and rocks. The mother bird was covering them with her warm breast feathers and refused to leave until I came within a few feet of her, and then only after savagely snapping her bill at me. She hissed, and puffed her feathers, in dire threats that would have been heeded had I not been well balanced on the shelf, from which I hoped to get a photograph of the owlets. Having once long ago felt the claws of a mother owl in my back while approaching her young, I had no desire to repeat the experience. So I took my snapshots quickly and crawled back along the narrow shelf, but not before the anxious mother had returned, bringing her mate with her to help drive off the enemy. Both came close, hooting and snapping their bills at me in threatening tones as I hurried down over the rocks to allay their fears and let them go back to the young, which were already shivering in the cold wind. The mother was soon back on the nest, sheltering the young, while the old male hooted occasionally from a neighboring rock as I remained below to study the scraps from their table." At the base of the cliff, pellets of fur and bones regurgitated from the stomachs of the Owls, and numberless bones of small animals scattered over the ground from old disintegrated pellets, told the long story of their nightly catches.

Examination of the pellets and bones from different caves and cliffs showed variation depending on the local abundance of prey, but "represented practically the whole rodent and small animal population of the region. The check on the over-abundance of these rodent pests "is of vital importance in an arid region devoted to agriculture and grazing" (1928a, pp. 142-145).

While in some places in New Mexico our collectors have heard complaints that these Owls killed chickens, the stomach contents of specimens taken revealed, instead, mole crickets, mud puppies, mice, and rabbits. A stomach examined by Major Goldman contained a full grown cottontail, including the feet, ears, and parts of the skull, while another contained wads of fur and part of the vertebrae of a jack rabbit (MS). If, as Doctor Fisher has pointed out, ranchmen would shut up their chickens at night, they would avoid trouble and continue to get the benefit of the good work done by the hawks and owls.

Whatever its local standing, this Great Horned Owl is one of the royal birds of the land, a meeting with which may well distinguish a day in the field.

ADDITIONAL LITERATURE.—BAERG, W. J., Auk, XLIII, 214-217, 1926 (trying to tame).—BREWSTER, WILLIAM, Bull. Mus. Comp. Zool., Harvard College, LXVI, 384-397, 1925.—DIXON, JAMES B., Condor, XVI, 47-54, 1914.—DUTCHER, WILLIAM, Educational Leaflet 19, Nat. Assoc. Audubon Soc.—GILMAN, M. F., Condor, XI, 145-146, 1909.—HOLLAND, HAROLD M., Bird-Lore, XXVIII, 1-4, 1926.—KEYES, C. R., Condor, XIII, 1-19, 1911.—PEARSON, T. G., Educational Leaflet 105, Nat. Assoc. Audubon Soc.—PITTMAN, H. H., Bird-Lore, XXVII, 92-96, 1925 (food at nest).—REED, B. P., Auk, XLII, 14-31, 1925 (young).—ROCKWELL, R. B., Condor, X, 14-17, 1908.—THAYER, G. H., Concealing-Coloration in the Animal Kingdom, Fig. 36 and p. 41, 1909.

WESTERN HORNED OWL: *Búbo virginianus occidentális* Stone

DESCRIPTION.—*Male*: Wing 13.1-14 inches, tail 8-8.8, bill 1.4-1.6. *Female*: Wing 14-15.4 inches, tail 8.7-9.5, bill 1.5-1.7. Like the Pallid Horned Owl but considerably larger; colors averaging darker.

RANGE.—Rocky Mountain region and central United States. From central Alberta, Montana, and Minnesota south to Kansas, northern New Mexico, Utah, Nevada, and southeastern Oregon. Recorded from Iowa in winter.

STATE RECORDS.—The Western Horned Owl, which comes down from the north, has been found mainly in northern and eastern New Mexico. [In timbered gulches at Lake Burford it was fairly common, May-June, 1918 (Wetmore). In northern Santa Fe County, where it is common, nesting in cut banks and less often in cavities in large cottonwoods, a pair nests regularly in a cut on the Santa Fe-Lamey Railway near Arroyo Hondo, about 6 feet from passing trains (Jensen, 1922). At Santa Fe it was seen in the winter of 1922-23 (Jensen).] In the Culebra Mountains, at 10,700 feet, it was heard August 20, 1904, and on Pecos Baldy at 11,000 feet, July 31, 1903 (Bailey). One was also reported killed at Kochler, about July 25, 1913 (Kalmbach). Specimens have been taken at Catskill, September 28, 1903 (Howell); Perico Arroyo, February 27, 1905 (R. Alcorta); Horse Lake, September 21, 1904 (Gaut); (Lake Burford, June 16, 1918 (Wetmore)); Jemez Mountains, September 6, 1906 (Bailey); (Cabezon, August 10, 1916 (Ligon)); Acoma, September 27, 1906 (Bailey); San Mateo Mountains, 8,000 feet, September 17, 1909 (Goldman).

ROCKY MOUNTAIN PYGMY OWL: *Glaucidium gnóma pinícola* Nelson

DESCRIPTION.—*Wing*: 3.7 inches. Head *without ear-tufts*, facial disc very incomplete, *legs fully feathered*, toes mainly bristly, wings short, tail long. *Adults*: Upperparts *grayish brown*, head *specked* and tail *barred* with white; underparts white, streaked with brown. Eyes lemon yellow, bill and feet dull greenish yellow.

RANGE.—Timbered mountains of northern Colorado, Arizona, New Mexico, and Sierra Madre of Mexico.

STATE RECORDS.—The type specimen of the Rocky Mountain Pygmy Owl was taken December 25, 1908, at Alma, New Mexico (Hunter), and a specimen was taken in the same region, 30 miles north of Silver City, December 30, 1913 (Kellogg). [Young flying with adults were seen, July 30, 1920, 12 miles northwest of Pinos Altos, in the Black Range (Ligon).] An adult with a brood of four young was found July 6, 1889, near San Pedro at 7,000 feet (Bailey), which is probably at about as low an altitude as this species nests in New Mexico. It is most common from 8,000 to 9,000 feet, at which altitudes it has been found near Willis (Henshaw); Jemez Mountains,

September 3, 1906 (Bailey); Pinyon Mountains near Acoma, October 3; and a few days later in the neighboring Largo Canyon (Bailey). [Eight miles west of Cloudcroft at 7,000 feet, one was taken September 2, 1916 (Ligon).] It was noted in the Gila National Forest, from 7,000 to 8,000 feet, August 31 to September 6, 1908 (Birdseye); in the Manzano Mountains, at 8,000 feet, October, 1903 (Gaut); and heard in the Mogollon Mountains, up to 10,000 feet, October 21-31, 1908 (Goldman). One was heard at a lower altitude than usual at 5,800 feet, in the Animas Mountains, August 6, 1908 (Bailey), while the type was taken at about the same altitude December 25, and probably was a bird that had wandered down in the winter from its summer home in the neighboring mountains. The line from the Sacramento Mountains to the Sangre de Cristos represents the eastern edge of the known range of the species in New Mexico. [While rather common in the yellow pine generally, it has been found most abundant on the Mescalero Indian Reservation near Cloudcroft; also common in the Black Range, and about Glorieta in Santa Fe County (Ligon, 1916-1918); seen at Santa Fe in the winter of 1922-23 (Jensen).]—W. W. COOKE.

NEST.—Usually in old woodpecker holes in trees and stumps. *Eggs*: 3 to 4, white or whitish.

FOOD.—Mainly grasshoppers and other insects, but also small mammals, birds, reptiles, and batrachians. One taken by Mr. Ligon had its stomach packed with the flesh and hair of mice. One reported by Mr. H. C. Johnson was "literally gorged with English Sparrows."

GENERAL HABITS.—A Rocky Mountain Pygmy Owl taken by Mr. Bailey in Santa Clara Canyon at sundown had a meadow mouse in its stomach and gray fur in its claws. It was in the midst of its molt at the time—September 3—its head, body, and yellow feet being pinfeathery, its wing quills only partly new. It was an immature female and its call, which had betrayed it in the top of a dead tree in the gulch back of camp, was a long whistle followed by a cuckoo-like *cuck, cuck, cuck, cuck, cuck*.

One of the Pygmies was heard by Mr. Birdseye at night high up in the San Francisco Mountains, but three specimens taken by him on the Negrito and Frisco Rivers when discovered were sitting out in the broad sunshine, and the stomach of one was filled with grasshoppers, proving that it had been hunting in daylight. The little Owls seem to be most active in the early morning and late afternoon, Mr. Henshaw says, although he has seen one flying around at noon.

In the Sacramento Mountains Mr. Ligon has discovered two "by the hummingbirds fighting them," and finds that "the juncos also often betray the presence of the little Owl, perched knot-like, on a limb" (MS).

Pygmy Owls found at a nest by Mr. Schnack had the "curious trick of flattening themselves out on a branch so that it was almost impossible to tell them from the branch itself."

A pair of Pygmies watched in the Yosemite, by Mr. F. C. Holman, had many interesting habits. When the male came with food for his mate, instead of flying to the nest hole, he stopped at an oak grove

some little distance away, doubtless in consideration of owl-mobbing neighbors. Here he gave a whistle, a single note usually repeated three times, to which his mate responded with a soft twitter as she flew to him. Among the various tidbits brought her, lizards were easily recognized by their long, hanging tails (1926, p. 92.).

As this attractive little Owl is both diurnal and tame and breeds in New Mexico, it offers an opportunity for interesting nest studies that should not be missed. Its love notes have been compared to the soft cooing of the Mourning Dove.

ADDITIONAL LITERATURE.—MAILLIARD, JOSEPH, Condor, XXIV, 31-32, 1922 (bathing).

ELF OWL: *Micropallas whitneyi whitneyi* (J. G. Cooper)

PLATE 60

DESCRIPTION.—*Length: 5.5-6.2 inches, wing 4-4.4, tail 1.9-2.3. Head without ear-tufts, facial disc incomplete, legs scantily haired, toes sparsely bristled, claws small and weak. Dichromatic. Adults: Hind-neck with interrupted whitish collar, upperparts grayish or brownish, finely mottled with darker and indistinctly speckled with pale rusty; tail brownish, with five or six narrow, interrupted bands of pale brownish or rusty; wings spotted with whitish and pale rusty; eyebrows, lores and "cravat" white; underparts white, vertically blotched with dark brown and rusty, and finely mottled with darker; iris bright yellow. Young: Similar to adults but top of head nearly pure brownish gray, without cinnamon buff on face or throat, or buffy brown on underparts; underparts irregularly marbled and barred.*

RANGE.—Southeastern California to southwestern New Mexico and south through tablelands of Mexico.

STATE RECORDS.—The Elf Owl is a common inhabitant of southeastern Arizona nearly to the New Mexico line and one was collected September 6, 1886, near Apache (Anthony). [At Red Rock, 30 miles west of Silver City, two were taken, May 13, 1924, by Mr. Kellogg; and at Silver City, where he has collected others, he says they are rather common. Mr. Ligon thinks Silver City about the northern boundary of their range in the State (1916-1918).]—W. W. COOKE.

NEST.—In old woodpecker holes in giant cactus or hollow trees. *Eggs: 2 to 5, white.*

FOOD.—So far as known, beetles, black ants, crickets, caterpillars, and small mammals.

GENERAL HABITS.—With the Western Great Horned Owl—nearly two feet long—at one end of our owl scale, and the Elf Owl—only five or six inches long—at the other, we can well appreciate the name *Micropallas*, for the Elf is the smallest of the owls sacred to Pallas, the Goddess of Wisdom. Able to perch quite comfortably on a man's thumb, this tiny Owl, were it not so strictly nocturnal, would repay a visit to the giant cactus country to study its little known habits. Its calls are heard "as soon as it begins to grow dark," so something interesting might be learned by the student on the ground, especially as Major Bendire has found that the Elfs are attracted by a camp fire and its flying insects.

One of the little fellows that Mr. Frank Stephens surprised in an elder bush turned its side to him and drawing itself down into the smallest possible compass raised a wing as a protectively colored shield which it held before its face, only its eyes showing above the feathers, turning as he turned—wise little namesake of Pallas (in Brewster, 1882b, p. 28).

ADDITIONAL LITERATURE.—BROWN, HERBERT, *Auk*, XX, 43-45, 1903.—GILMAN, M. F., *Condor*, XI, 149-150, 1909.—WILLARD, F. C., *Condor*, XIV, 55, 59, 1912.

BURROWING OWL: *Speotyto cunicularia hypogaea* (Bonaparte)

PLATE 34

DESCRIPTION.—*Length*: 9 to 11 inches, wing 5.8-7.2, tail 3.1-3.5, bill .5-.6, tarsus 1.7-1.9. *Head without ear-tufts*, facial disc incomplete, tail short, *legs very long, nearly bare*, toes bristly. *Adults*: Upperparts dull brown, spotted and barred with white and buffy; wings and tail barred with white, line over eye, chin, and throat white; underparts mainly buffy, barred with brown; iris yellow. *Young*: Upperparts mainly plain brownish, wing and tail coverts largely buff, and underparts mainly buff with dark throat band and shaded sides of chest.

RANGE.—Plains region from British Columbia to Manitoba and south to Louisiana and Panama; migratory north of Oregon and northern Kansas.

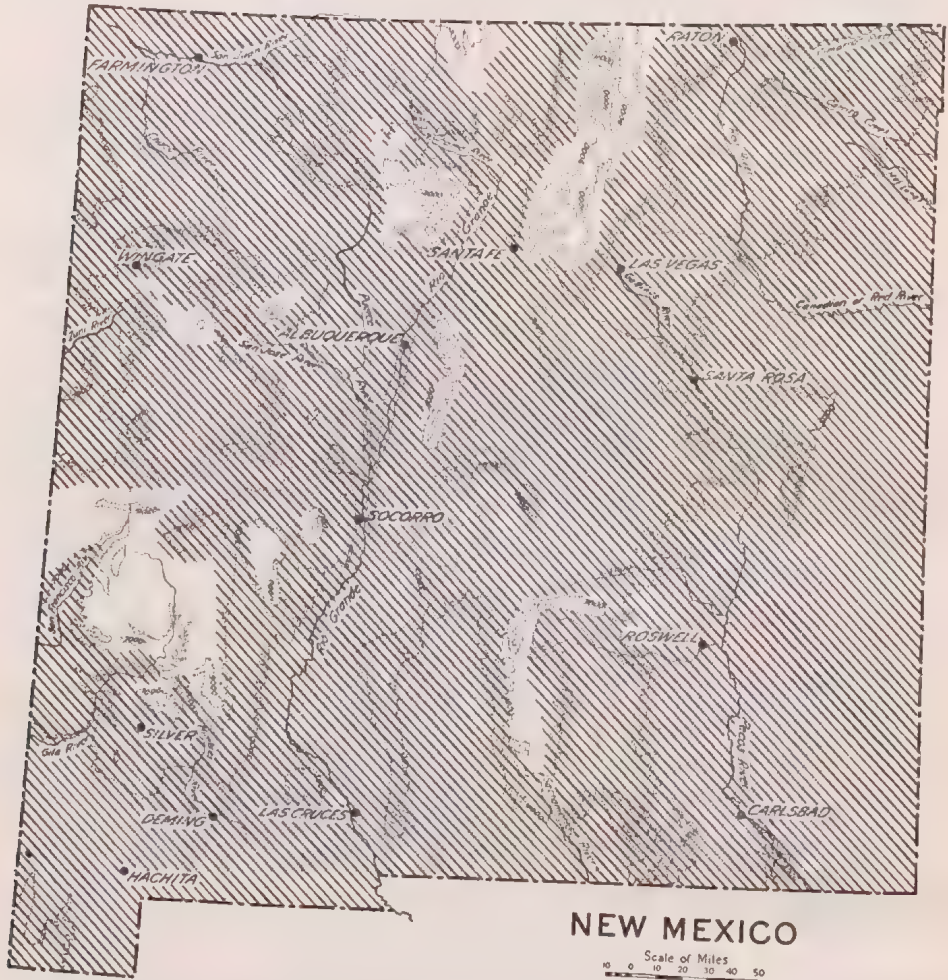
STATE RECORDS.—The earliest record of the Burrowing Owl in New Mexico is August 7, 1820, when Titian R. Peale, of Major Long's Expedition to the Rocky Mountains, killed one near the junction of the Mora and Canadian Rivers, in north-eastern New Mexico. A few days before the party had dined on badger and a young owl—presumably of this species (in James, 1823, p. 97). As is usual, the Burrowing Owls are most commonly found in or near the prairie dog towns, but they are not so common as the prairie dog and there are many of the dog towns where the Owls are not in evidence. They breed from the lowest parts of the State, as at Carlsbad (Bailey), Roswell (Gaut), and Mesilla (Merrill), below 4,000 feet, to the foothills of the mountains, at Silver City, 5,857 feet (Kellogg), and were found at about 6,000 feet near Koehler Junction, July 28–October 24, 1913 (Kalmbach); [at Raton, June 25–28, 1916 (Howarth)]; at 8,000 feet as at Halls Peak (Barber). Between these limits they are found locally throughout the State. [Fairly common in northern Santa Fe County. A small colony was found near Santa Cruz, May 9, 1920, with two sets of eggs. A few scattered pairs nest on the Pinyon Flat, near Santa Fe (Jensen, 1922). In the Animas Valley a pair was seen at the nesting burrow May 8, 1920; in the Pecos Valley, from Roswell to Fort Sumner, June 16–21, 1918, they were generally distributed and nesting; and they were common on the open flats about Dunlap where they were apparently nesting (Ligon).]

Some were seen near Tularosa, December 23, 1902; a month later they were still present at the Gold Camp in the southern part of the San Andres Mountains (Gaut), and January 28, were found at Mesilla Park (Ford); in the vicinity of the Carlsbad Bird Reserve, they were common, January, 1915, and were noted below the reserve in the winter of 1915–16 (Willett), showing that at least in the valleys of New Mexico some individuals remain through the winter.—W. W. COOKE.

NEST.—Usually at the end of an old burrow of prairie dog, badger, or other animal. *Eggs*: 6 to 11, white.

FOOD.—Immense numbers of noxious insects such as grasshoppers, crickets, beetles; and scorpions, centipedes, mice, kangaroo rats, ground squirrels, young prairie dogs, and rarely, insectivorous birds; also fruit and seeds.

GENERAL HABITS.—The droll little Burrowing Owls, stilted up on their long bony legs, bowing as you approach, and turning their heads around over their shoulders to watch you as you pass on, afford much amusement and interest when in the land of "dog-towns."



MAP 13. BURROWING OWL

Shaded area shows general breeding range, mainly in Lower and Upper Sonoran Zones; occasionally in lower edge of Transition Zone

Large families may often be seen standing around the mouths of their burrows in the sun, but on a hot day in summer an entire family of eight or nine have been seen by Mr. M. F. Gilman enjoying the shade of a bush several feet from the hole.

Living in the deserted burrows of prairie dogs, badgers, the large kangaroo rats, spermophiles, woodchucks, foxes, skunks, and armadillos, they forage in good weather, and collect stores to last them



HORNED OWL.

GENERAL HABITS.—The droll little Burrowing Owls, stilted up on their long bony legs, bowing as you approach, and turning their heads around over their shoulders to watch you as you pass on, afford much amusement and interest when in the land of "dog-towns."



MAP 13. BURROWING OWL

Shaded area shows general breeding range, mainly in Lower and Upper Sonoran Zones; occasionally in lower edge of Transition Zone

Large families may often be seen standing around the mouths of their burrows in the sun, but on a hot day in summer an entire family of eight or nine have been seen by Mr. M. F. Gilman enjoying the shade of a bush several feet from the hole.

Living in the deserted burrows of prairie dogs, badgers, the large kangaroo rats, spermophiles, woodchucks, foxes, skunks, and armadillos, they forage in good weather, and collect stores to last them



BURROWING OWL

during bad weather. In winter as many as twenty have been found in one burrow with abundant provisions. In one case, "forty-three mice . . . were scattered along the run to their common apartment" (in Fisher, 1893, p. 191).

The Burrowing Owls are common all over the Pecos Valley at long distances from water, as well as near streams. There they breed in prairie dog holes and mark their breeding burrows by an accumulation of odd material scattered about the entrance. At one nest entrance near Roswell, Mr. Bailey noted a great abundance of dry horse manure, some corn cobs, charcoal, tufts of cow hair, bits of hide, pieces of bone, a child's woolen mitten, a piece of calico, and other rags, shore lark and other bird feathers, and bits of insects (MS). Part of this material was evidently the remains of food. The rest may have been collected on the principle that Rock Wrens apparently mark their nest hole in a cliff full of holes, as a matter of convenience; or, if prairie dogs ever enter each other's burrows, the door plate may be to prevent unpleasant mistakes. The smooth brown ejected pellets are easily picked up around the burrows, and if examined by experts give the menu of this useful little Owl.

In the region about Mesilla Park, Professor Merrill reported that the Owls were found mostly in the grass belt on the mesa with prairie dogs, but he discovered two families and a colony living by themselves, away from prairie dog towns. One family nested in a hole in the river bank—the young were flying before the middle of July—and the other family nested in a gopher hole along a ditch bank. The colony, which contained about two dozen, was in the high bank of an arroyo about three miles out on the mesa (MS).

In the summer of 1924, Mr. Ligon found the Owls common in practically all prairie-dog infested areas in the Pecos Valley and eastern and northeastern sections of the State. They were especially numerous in the White Lakes section northeast of Roswell, in Quay County south of Tucumcari, and near Albert. In Quay County, where the prairie dogs had been poisoned for five years, the Owls had collected in great numbers in the small town where the remaining dogs had congregated (MS).

In the stomach of one specimen killed east of Las Cruces, where the Owls were numerous in prairie dog towns, Professor Merrill found the remains of many grasshoppers, mixed with the fruit of the Tesajilla cactus. On top of the mound were parts of grasshoppers, cactus seeds, and parts of the fig-eating, wood-boring, and burying beetles. Near Carlsbad in a prairie dog town on the Bolles Ranch, where the Owls were common, Mr. Bailey found that their pellets contained a marked quantity of fragments of the large green beetles, which were eating ripe plums in the orchard.

In a prairie dog town in the southwest foothills of the Capitan Mountains, Mr. Gaut wrote of a family which he watched being fed. "The five young ones would stay close about a certain hole in the town, probably the one where they were reared. When approached they would scramble down the hole and stay there until the parent birds arrived and informed them that all danger was over. At the time when I approached, the old birds flew off a short distance and tried to attract my attention with a curious little dancing performance. A short while after their scare had calmed down, one of the adults captured a grasshopper and carried it to its young, whereupon the little ones scrambled about, each trying to prevent the others from getting ahead of it. These same tactics were repeated when a large black beetle was captured to be fed to them" (MS).

ARIZONA SPOTTED OWL: *Strix occidentális lúcida* (Nelson)

DESCRIPTION.—*Length:* 16.5-18 inches. *Head very large, without ear-tufts; facial disc gray, extensive; upperparts dark brown, head and neck coarsely spotted with white, the white on hind-neck in form of transverse bars; tail long, with five white bands; wing quills with white bars; throat and lower median underparts pure white, chest with distinct bars, rest of underparts barred and spotted with brown.*

RANGE.—Colorado and the mountains of south-central New Mexico, eastern Arizona, and western Texas south to Michoacan and Guanajuato.

STATE RECORDS.—When Woodhouse visited New Mexico in 1851, he reported the Spotted Owl as common in the State. Since then ornithologists have met the species only rarely. [Ligon has found it most commonly from 6,500 to 9,000 feet through the south-central part, in the Sacramento and San Mateo Mountains, the Black Range and Mogollon Mountains, though also as far north as the Sangre de Cristo Range east of Taos. He has found nesting sites, nests, and eggs (1926, pp. 421-429).] It is so strictly non-migratory that it undoubtedly breeds wherever it occurs. During the fall of 1913, several specimens were collected; in the San Mateo Mountains October 1 at 7,000 feet; near Chloride October 22 at 6,500 feet; Taylor Creek Gorge in the Black Range, about 30 miles northwest of Chloride, November 13, 1913. It was found near Eagle Peak, in the Tularosa Mountains, December 5, 1913, at 8,000 feet; five were collected northwest of Reserve, 7,500-8,500 feet in the region of Center Fire, Bill Night Gap, and Spur Lake, and others heard, in 1915 (Ligon). A specimen was taken August 20, 1883, near Willis at 8,000 feet (Henshaw). [On June 21, 1924, one was heard in a canyon on the Taos-Cimarron Highway, about 8 miles southeast of Taos (Ligon). It was seen in the winter of 1922-23 at Santa Fe; and a pair May 15, 1927, in the Jemez Mountains (Jensen). Two were noted in December, 1898, at 9,500 feet near Las Vegas (Mitchell). An adult male was taken, November 10, 1918, in a cottonwood grove on the Gila River, 20 miles west of Silver City (Kellogg).] One was seen October 8, 1903, at 8,100 feet in the Manzano Mountains (Gaut), and a pair at El Rito (Henderson); one was heard at about 7,000 feet near the head of Powderhorn Canyon on the Mimbres the middle of May, 1906 (Bailey); one at about 8,000 feet in the Sacramento Mountains near Clouderoft, September, 1902 (Hollister); two were heard on several consecutive nights the middle of October, 1906, at about 8,000 feet on Willow Creek in the Mogollon Mountains; and on August 20, 1901, one was heard at 8,000 feet near the head

of McKittrick Canyon in the Guadalupe Mountains of Texas just over the New Mexico line (Bailey).—W. W. COOKE.

NEST.—In caves, in crevices in canyon walls, in cavities of trees, or in a fork near the trunk; made of sticks, twigs, and dry inner bark, lined with dry grass and a few feathers. *Eggs*: 2 to 4, white.



Courtesy of *The Auk*, photograph by J. Stokley Ligon

FIG. 53. Arizona Spotted Owl

The old mother on the edge of the nest. Surely she will not let the beautiful eggs get cold

GENERAL HABITS.—The significance of the spotting of this Owl is suggested by Mr. Donald R. Dickey who found an old one with young in a cliff in California. He found her once “dozing in a small oak near the nest,” and says, “Her protective coloration, noticeable at all times, was particularly so as she sat in the oak. . . Whether she clung to the cliff, or sat close against the mottled fir trunk, or in the spotted light and shade of the oak foliage, her harmonization was startlingly complete (1914, p. 196).

In the Huachuca Mountains, Arizona, Mr. Swarth found the Spotted Owl resident above 6,500 feet in the dark thickets of quaking aspen and also in the canyons usually not far from water (1904, p. 8). In New Mexico Mr. Ligon has found them in narrow, well-shaded canyons in pairs, generally sitting in small, dense white or Douglas fir trees, as they are “entirely nocturnal.” The food of those he examined consisted almost entirely of the large blue wood rats common in the region (1926b, p. 422).

Three young "that had left their nest and were seeking their own livelihood" were found by Mr. E. S. Steele "in a dark canyon west of Reserve." They were so tame that he succeeded in catching one, taking him home to study his diet. Put in a barn overrun with rats and mice he quickly cleaned them out. When offered the bodies of birds and parts of chicken, even when hungry he refused to touch them, but as Mr. Steele says, "When I approached with a rodent I could notice an expression of pleasure creep into his countenance—it seemed as if he actually smiled! He never refused at any time of day to take a squirrel, chipmunk, rat, or mouse from my hand" (1927, p. 123).

Two Spotted Owls apparently lived in the cold spruce and fir gulch above our 8,500-foot camp in the Mogollons in 1906, and the variety of their notes as they called to each other in the mornings and evenings was surprising. One of their commonest calls was a short bark, and another *who-who-who'*, but on moonlight nights the two birds were heard answering each other, a soft conversational *who-who-who-who-who-who-who* being replied to by a sharp *wheck-wheck-wheck-wheck-wheck*.

AMERICAN LONG-EARED OWL: *Ásio wilsoniánus* (Lesson)

DESCRIPTION.—*Length*: 13–16 inches, wing 11.5–12, tail 6–6.2, bill .6, tarsus 1.2. *Ear-tufts long, conspicuous, near together*, bill with bristles at base, legs and feet feathered to claws. *Adults*: *Upperparts brownish-black*, minutely mottled or vermiculated with grayish white and variegated with tawny of basal parts of feathers; tail and wings barred, under primary coverts brownish black making dark "*wrist-spot*" (Seton-Thompson, 1901, pp. 187–189); *facial disc mainly tawny*, framed in black, "*eyebrows*," lores, and chin, whitish, underparts whitish (yellowish brown beneath surface), with dark shaft streaks and crossbars; iris yellow, bill and claws blackish. *Young in juvenal plumage*: Ear tufts shorter and facial disc darker than in adults, most of body feathers brown, barred and tipped with whitish.

RANGE.—Breeds from coast of southern Alaska, central British Columbia, southern Mackenzie, central Manitoba, Ontario, southern Quebec, and Newfoundland south to Virginia, Arkansas, northern Texas, New Mexico, Arizona, and southern California; winters from southern Canada to Georgia, the Gulf States, and central Mexico.

STATE RECORDS.—The Long-eared Owl breeds in the northern United States and is not rare as a breeder south to southern La Plata County, Colorado, within 20 miles of the New Mexico boundary. Mitchell records it as breeding in San Miguel County, New Mexico, up to 10,000 feet. [Ligon has found it nesting in the northern half of the State, west of the Rio Grande (1916–1918), and 35 miles northwest of Grant, at 7,500 feet, on June 28, 1916, found a nest and one almost feathered young out of the nest.]

In the fall migration it was noted along the Rio Grande at Forts Fillmore and Thorn (Henry); in September, 1911, near Mesilla Park (McAnnich); [on September 22, 1924, at Santa Fe (Jensen)]; at Silver City, November 5, 1912 (Kellogg); State College, November 17, 1915 (Merrill).

The species occurs in New Mexico in winter. It has been seen in Bear Canyon, San Andres Mountains, January 20, 1903 (Gaut); at Silver City, February 3 to 17, 1884 (Marsh); at the same place in January, 1905 (Hunn); in the vicinity of the

Carlsbad Bird Reserve, January, 1915 (Willelt); at Mesquite, February 8, 1914 (Archer); in the southern part of the State, February 8, 1915; [and in the winter of 1916-17 (Ligon).]

On the return in the spring, it was taken near Mesilla Park March 3, 1903 (Ford); noted on the boundary a hundred miles west of El Paso, April 22, 1892 (Mearns); and near Apache, April 30, 1886 (Anthony).—W. W. COOKE.



Courtesy of *Bird-Lore*; photograph by H. W. Nash

FIG. 54. Long-eared Owl
Terrifying the enemy

NEST.—Generally in forest or woodland in conifers, in various protecting hollows, 10 to 30 feet from the ground, but also in deserted nests of other birds—hawks, crows, magpies, or herons, and sometimes in wood rat houses; lined with grass, dead leaves, and feathers. *Eggs:* Generally 4 or 5, white.

FOOD.—Mainly small rodents, as mice, squirrels, gophers, but also frogs, a few birds, and many beetles, especially wood borers, destructive to fruit and forest trees. In 225 pellets, bones of 187 small mammals (mostly mice) were found (Wetmore). "It does an enormous amount of good" but is one of the greatest sufferers when bounties are paid for the destruction of birds of prey (Fisher, 1907, p. 11).

GENERAL HABITS.—The first Long-eared Owl seen at Santa Fe by Mr. Jensen, came soaring over the Indian School campus and landed on a box in his chicken yard. About twenty Indian youngsters saw it and quickly gathered at the spot, trying to kill the "ghost." The previous winter had been a great owl winter, the Western Great Horned,

Arizona Spotted, the Mexican Screech Owl, the Saw-whet and the Pygmy all being seen on the Indian School campus (MS).

One of the Long-eared Owls found by Mr. Ligon on February 8, 1915, at about 7,800 feet, was in a juniper on a brushy south slope, where there was little snow to obscure the view of its small prey. When disturbed it flew into a pinyon tree (MS). A nest that he found was in a thick Douglas fir sapling under the rim of a high mesa.

The Long-ear is a great poser. When encountered in a tree in the woods it will sometimes draw itself up very tall and thin, with ears erected, like the pictures on protective attitudes, one wing curiously drawn half way across its breast helping to narrow its body and make it look more like the tree trunk. If disturbed on the nest, the brooding bird will flatten itself down so that it can not be seen from below; and when a cornered young one becomes too greatly tried by an enthusiastic photographer it will lean down, fluffing out its feathers, spreading its wings wide at its sides, and fixing its big yellow eyes upon the enemy with suggestive snappings of the bill and other threatening noises. But though it rouses itself to go through its theatrical performances in the daytime, and the parent Long-ears show great alertness and anxiety at the nest when visited by day, a young one well met in the forest, after a little bravado will close its big yellow eyes and drop off to sleep while you watch below.

There is the charm of novelty and mystery attaching to these night watchmen of the forest, and no opportunity should be missed to add to our meager knowledge of their life histories.

ADDITIONAL LITERATURE.—BAILEY, F. M., *Bird-Lore*, XV, 285-290, 1913 (nesting habits).—BREWSTER, WILLIAM, *Bull. Mus. Comp. Zool.*, Harvard College, LXVI, 367-370, 1925.

SHORT-EARED OWL: *Ásio flámmeus* (Pontoppidan)

DESCRIPTION.—*Length*: 13.8-16.7 inches, wing 11.8-13, tail 5.8-6.1, bill .6, tarsus about 1.7. Ear opening 2 inches or more across. *Ear-tufts short and inconspicuous*. *Adults*: General color yellowish brown to buffy white (with great individual variation) heavily striped with darker above, lightly below; tail and wings banded, under primary coverts with terminal half black, making a conspicuous wrist spot; facial disc white, ring around eye black; iris bright yellow, bill and claws blackish. *Young in juvenal plumage*: Upperparts sooty brown with broad buffy feather tips; underparts plain dull buffy; face plain blackish with light border; iris pale straw-yellow.

RANGE.—Nearly cosmopolitan. In North America breeds irregularly and locally from northern Alaska, northern Mackenzie, and Greenland south to Massachusetts, southern Kansas, Colorado, and California; winters from California, Wyoming, and Massachusetts south to Louisiana, Cuba, and Guatemala. Found in South America, Europe, and Asia.

STATE RECORDS.—A single specimen of the Short-eared Owl was taken in May 1892, at the Alamo Huaco Ranch, in Grant County (Mearns); one at Tortugas Mountains near Mesilla, March 20, 1903 (Ford); and one at the State College,

September 28, 1913 (Bone). A pair was noted at Perico, December 20, 1893 (Seton); one was noted in the vicinity of the Carlsbad Bird Reserve in January, 1915 (Willett). [A pair was noted near Gallup, September 30, 1916 (Skinner).] The species is included in Henry's list of the birds noted in New Mexico during the years from



From Biological Survey

FIG. 55. Short-eared Owl

A good mouser, both by day and by night

1853 to 1859. These are the only records of the Short-eared Owl in the State, but it is probably more common than the meager reports would indicate, for it is a well-known winter resident in all the country surrounding New Mexico.—W. W. COOKE.

NEST.—Usually a slight depression in the ground, lined with dry grass and feathers and hidden by the surrounding vegetation. *Eggs*: 4 to 7, white.

FOOD.—Fully 75 per cent mice, but also other small mammals, as shrews, gophers, small rabbits, and bats, together with some birds, amphibians, reptiles, crustaceans, scorpions, and insects, including grasshoppers, May beetles, and cutworms. Has frequently helped in suppression of vole plagues in Europe.

GENERAL HABITS.—As the Short-eared Owl is partially diurnal and a bird of the open country, it should be easily found. As I learned in North Dakota, it may be flushed from a grassy marsh, discovered silently watching you from the ground, from a fence post, or telephone pole; or seen flying on wide brown wings over brushy flats where it may surprise its furry prey. A pair which were flushed by Mr. Skinner in

western New Mexico from a thicket of cedar and oak, "made several short flights from place to place" as he pursued them, "but invariably sought shelter near together in a thick tree top" (MS).

Another pair were seen in northeastern New-Mexico in winter by Mr. Ernest Thompson Seton. As he says, "After sunset, on the trail home, I put up a pair of Short-eared Owls. They were resting on the prairie close together. They circled about each other in the air, uttering once or twice a short screech or scream" (MS). In Alaska, Mr. Alfred M. Bailey says, "This wide-ranging species was noted hovering over the tundra near Nome on June 21. Two birds worked back and forth over the ground as they watched for their prey. Their summer range extends far into the Arctic; the Eskimos collected several" (1926, p. 124).

In South America, Doctor Wetmore found them "fairly common in marshy areas on the pampas, and elsewhere . . . in tracts of low greasewoods or other small bushes" (1926b, p. 201).

This interesting bird is noted for what Mr. Dawes Du Bois calls "A Nuptial Song-flight of the Short-eared Owl." On a calm evening on the Great Plains, when sound carried to a long distance, from his Montana cabin the last day of May he first heard this "tooting song . . . *toot-toot-toot-toot-toot*, etc., repeated fifteen to twenty times, at the rate of four toots per second, in a low-pitched monotone." On the fifth of June, before dark, the tooting was heard again. Going out of his cabin to listen, Mr. Dubois relates, "upon gazing upward, I discovered the Owl directly overhead; and for a time was able to watch him, with the field-glass, in the fading light. He was flying at a great elevation; so great in fact that it was difficult to see him at all without the aid of the field-glass. For the most part his flight was with slow, silent flapping wings, although he sometimes soared. His course led in easy curves which kept him in the same general locality. His song, on this occasion, was made up of 16 to 18 toots. Now and then he made a short slanting dive which terminated with an upward swoop. The dive was accompanied by a peculiar fluttering noise, a sound of which I had been conscious for some time before I associated it with the Owl. It was such a sound as might be produced by a fluttering small bird imprisoned in a box; or by the flutter of a small flag in a very strong wind. Remembering that sound travels more slowly than light, I believed that the fluttering ceased before the upward swoop began. The seventh of June brought the coveted opportunity to watch the tooter in broad daylight. The sun shone upon him and enabled me to solve the mystery of the fluttering flag. When the Owl began the short dive he brought his wings together beneath him, stretching them back posteriorly and striking them rapidly together with short clapping strokes. The dive ended simultaneously with the clapping, when the bird spread

his wings, abruptly and noiselessly turning his course upward with a swoop. The clapping was clearly visible with the field-glass and the fluttering sound produced by it was distinctly audible." The flight-song was heard the following year on the seventeenth of March and "the high flight" and "wing clapping" on the twenty-third of June, when there were young in the nest. At this time, after examining the four young in the wheat field nest, Mr. Du Bois withdrew to watch the maneuvers of their parents. One parent disappeared, he says, "as soon as I left the young and was probably on the ground with them but the other flew and soared in circles above me, gradually climbing until he was at a great height. During the time that I watched, he twice indulged in wing-clapping. Having thus spiraled upward above me to his maximum height, he shifted his center of flight to a point more nearly over the nest, at the same time reducing his elevation" (1924, 260-261).

While studying the Short-eared Owls of that locality during a term of four years, Mr. Du Bois noted a number of "vocal sounds," which he gives under the heads of "nurture signals" and "cries of remonstrance." The "nurture signals," uttered by the parent while on the nest, during the nurture of young (observed from a tent-blind close to the nest), included "a low *cuk* somewhat similar to the cluck of a hen," that was "a note of reassurance to silence the chicks when they cried," warning notes when danger seemed to threaten, a note of affection, and "a hiss, or soughing sound, produced by expulsion of air through the open bill (not by vocal chords)," expressing "displeasure, admonition, or defiance." The "cries of remonstrance" included barking notes, a ferocious purring growl, and "a prolonged, very high-pitched squealing cry (a sham cry of distress), uttered while on the ground, either standing or floundering in simulation of injury and helplessness" (1924, pp. 262-263).

ADDITIONAL LITERATURE.—BREWSTER, WILLIAM, Bull. Mus. Comp. Zool., Harvard College, LXVI, 371-373, 1925.—DUBOIS, A. D., Auk, XL, 383-393, 1923 (foster mother to chickens); XLI, 260-263, 1924 (nuptial song flight).—KITCHIN, E. A., Condor, XXI, 21-25, 1919 (nest).—PHILIPP, P. B., Educational Leaflet 12, Nat. Assoc. Audubon Soc.—SAUNDERS, A. A., Condor, XV, 121-125, 1913.—URNER, C. A., Auk, XL, 30-36, 1923; XLII, 31-41, 1925 (nests).

SAW-WHET OWL: *Cryptoglaux acadica acadica* (Gmelin)

DESCRIPTION.—*Length*: 7.2-8.5 inches, wing 5.2-5.9, tail 2.8-3.2. Ear-parts very large and extremely unsymmetrical, skull seeming misshapen. *Head very large, without ear-tufts*, facial disc complete; feet closely feathered to claws. *Adults*: Upperparts brown, top of head with white shaft lines, back, wings and tail spotted with white, tail crossed with *three rows of white spots*, and tipped with white; brows and lores usually mainly whitish except for black spot at inner corner of eye, *face streaked with dark brown*; underparts white, *streaked coarsely with reddish brown*; iris yellow, bill, feet, and claws black. *Young in juvenal plumage*: Unlike adults except

for wings and tail, rest of upperparts unmarked, ruddy chocolate-brown; face plain brown with white eyebrows, underparts plain brown, lighter below.

RANGE.—Breeds chiefly in Canadian and Transition Zones from extreme southern Alaska, British Columbia, Alberta, Manitoba, Quebec, New Brunswick, and Nova Scotia south to Maryland and Pennsylvania (in mountains), northern Illinois, southern Nebraska, New Mexico, central Arizona, and eastern-central California.



FIG. 56. Saw-whet Owl

STATE RECORDS.—The Saw-whet Owl is a fairly common breeder south to central Colorado. Its earliest record for New Mexico is that of a specimen taken at Camp Burgwyn by Anderson and sent to the United States National Museum about 1858. There is no date of capture and the bird though immature is not young enough to indicate that it was reared in the immediate vicinity, so that the record can not be used as proof that the species breeds in the State.

One specimen was taken at Mesilla March 4, 1900, and is now in the College collection (Ford); and one was seen there September 28, 1912 (Merrill); but neither of these records indicates breeding. [An adult female was taken, January 23, 1923, three miles north of Silver City (Kellogg), and the species was observed at Santa Fe in the winter of 1922-23 (Jensen).]—W. W. COOKE.

NEST.—In hollow trees, old woodpecker or squirrel holes, or sometimes in nesting boxes. *Eggs:* 3 to 7, white.

FOOD.—Principally wood mice, but sometimes rats, half-grown squirrels, chipmunks, and in summer, many insects.

GENERAL HABITS.—The name Saw-whet comes from the peculiar call of this little Owl, which resembles "the sound made when a large-toothed saw is being filed."

While it lives in dense woods and sleeps in the daytime, hidden perhaps in an old woodpecker hole so that its habits can not easily be studied, one that Mr. Brewster had in captivity was caught in the act of disgorging pellets, a process which is doubtless similar in all the pellet-forming birds. As Mr. Brewster describes it, "the Owl would gape several times; then the head would be violently shaken sideways, and finally the pellet, coated with mucous, would shoot forth, frequently falling several inches in front of the spot where the bird was sitting. After it was all over the little fellow assumed an expression of relief and contentment which was very comical" (1882a, p. 24). In watching the fall migration at Point Pelee, Messrs. Taverner and Swales recorded "four migrational massings of this hitherto supposed resident owl," and concluded that "from the middle to the end of October, they migrate in considerable numbers, but from their nocturnal habits and secluded habitats while en route are seldom observed" (1911, p. 334).

NIGHTHAWKS, ETC.: STEPHENS WHIP-POOR-WILL 339

ADDITIONAL LITERATURE.—BREWSTER, WILLIAM, Bull. Mus. Comp. Zool., Harvard College, LXVI, 378-384, 1925.—RAY, M. S., Condor, XVI, 65-67, 1914.—TAVERNER, P. A., and B. H. SWALES, Auk, XXVIII, 329-334, 1911.

GOATSUCKERS, etc.: Order Caprimulgiformes

WHIP-POOR-WILLS, NIGHTHAWKS, POOR-WILLS, etc.: Family Caprimulgidae

The goatsuckers are highly specialized for catching aerial insects, their heads serving as fly traps, being broad and flattened, with no appreciable neck, the horny part of the bill minute, the gape enormous, beset with long bristles that prevent the escape of the insects. Their wings are long and pointed, and as they are more or less nocturnal, they resemble the owls in having large eyes and ears, and soft, lax plumage which gives them noiseless flight. Their legs are short, and their feet, used only in crouching on a branch or the ground, are very small. As they have no nest-building tools, their eggs are laid on the ground.

WHIP-POOR-WILLS AND POOR-WILLS: Subfamily Caprimulginae

STEPHENS WHIP-POOR-WILL: *Antróstomus vociferus arizónae* Brewster

DESCRIPTION.—*Length*: 9.6-10.2 inches, wing 6.3-6.6, tail 4-5.4, longer rectal bristles about 1.4-1.8. *Adult male*: Throat blackish, bordered by tawny band; rest of underparts mixed tawny and black; upperparts mottled grayish or brownish, streaked, spotted, and barred with blackish; three outer tail feathers white for less than terminal third; wings much marked with reddish brown. *Adult female*: Similar, but outer tail feathers tipped with buffy or pale clay-color. *Young male*: Similar to adult male but top of head spotted instead of streaked with black, throat band indistinct, wing coverts and scapulars broadly barred with dusky, and irregularly marked with black; underparts barred with dusky on a brownish buffy ground. *Young female*: Similar to young male but outer tail feathers tipped with brownish buff instead of white.

RANGE.—Mountains of southern Arizona, New Mexico, and southwestern Texas south to Jalisco and Durango.

STATE RECORDS.—From its winter home in Mexico, the Stephens Whip-poor-will comes north into southwestern New Mexico and is a rare breeder at Fort Bayard, 6,000 feet (Wilson), Chloride, 6,000 feet (Ligon), and up the Mimbres to at least 6,500 feet (Bailey). It was taken July 5-13, 1892, in the San Luis Mountains (Mearns), and one was heard at 6,800 feet in the Animas Mountains in early August, 1908 (Goldman). It was taken May 21, 1892, on the Hachita Grande Mountains (Mearns); was heard May 18, 1913, in Monument Pass, Black Range, 8,000 feet; and was common June 7, ten miles to the westward at 7,200 feet. [A male was taken June 8, 1920, at the north end of the Black Range, ten miles northwest of Chloride at 7,300 feet, and one was taken, August 14, 1920, 35 miles northwest of Pinos Altos on Turkey Creek at about 7,000 feet (Ligon).]

Since it was found August 21, 1901, at 7,800 feet in the Guadalupe Mountains of Texas just south of the New Mexico line, it probably also occurs in these mountains on the New Mexico side. There is no reason for believing that the species ever winters in New Mexico, but it probably returns to the State in late April or early May. [A remarkably early date for its appearance has been recorded by A. P.

Smith, who heard two birds at Rodeo, March 2, 1917, above 4,000 feet, in freezing weather.]—W. W. COOKE.

EGGS.—Laid in a slight depression on the ground, 1 or 2, white, with faint markings.

GENERAL HABITS.—When we were making a night's camp at the head of McKittrick Canyon in the Guadalupe Mountains, as the darkness settled down and we were trying to keep warm close to a small camp fire under the pines, to our delight the dusky forms of Stephens Whip-poor-will—a new bird to me—appeared from the shadows and wavered around us, calling in soft burred tones, *whip-pur'r-will'*, *whip-pur'r-will'*, *whip-pur'r-will'*.

In the Chiricahua Mountains of Arizona, where Mr. Stephens heard the first arrivals about the middle of May, by June 1, he says, "they were as common as I ever knew them [Whip-poor-wills] to be in the east; sometimes I could hear three or four whistling at once" (in Brewster, 1880, p. 71).

They seem to frequent the rocky sides of canyons. While feeding, Doctor Fisher says, "they often alight on a prominent rock or dead stub, from which they launch out after passing insects, and return to wait for other prey" (in Bendire, 1895, p. 152).

POOR-WILL: *Phalaenoptilus nuttalli nuttalli* (Audubon)

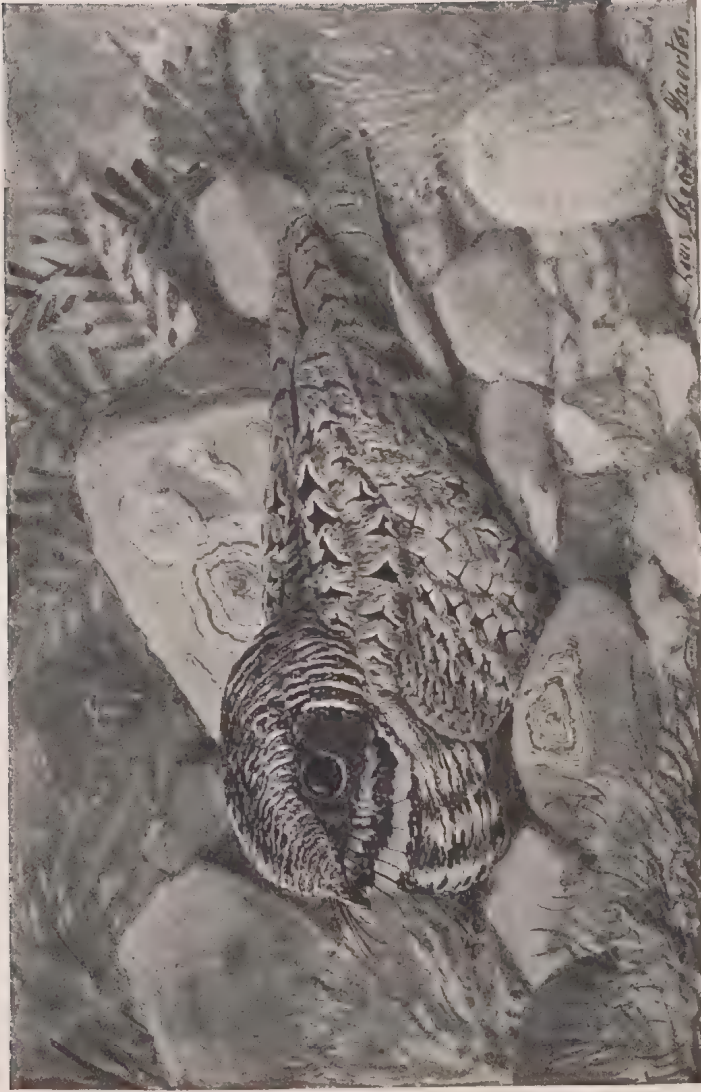
PLATE 35

DESCRIPTION.—*Length*: 7.2 to 8.5 inches, wing 5.6–5.7, tail 3.7–3.9. *Adult*: Head narrowly barred with black; plumage of upperparts soft and velvety, *moth-like*; finely mottled with brownish gray or grayish brown; with sharply contrasting *velvety black bars and sagittate markings*; square tail with all but two middle pairs of feathers more or less banded with black, gray, and buffy, tipped with white; wings with ochraceous-buff, black, and gray markings; primaries heavily banded with black; sides of head and chin sooty or brown, throat silky white, bordered by black or brown below; rest of underparts (except tail coverts) barred. *Young*: Similar, but markings less sharply defined, especially on underparts, and throat patch buff instead of white.

RANGE.—Breeds in Transition and Upper Sonoran Zones from southeastern British Columbia, Idaho, Montana, and northwestern North Dakota south to central Texas, northern Coahuila, western Arizona, and Cape Region of Lower California; winters from southeastern California and southern Texas to central Mexico.

STATE RECORDS.—The Poor-will found most commonly in the foothills (Ligon), occupies the western part of New Mexico, east to the Guadalupe Mountains, Carlsbad, Cedar Point, near Roswell, Cuervo (Bailey); near Kochler Junction (Kalmbach); Oak Canyon and Bear Canyon (Howell); but is less common east of the Rio Grande than in the western part of the State. [A pair was seen several times in June, 1924, in Santa Fe Canyon at about 10,000 feet (Jensen). It was abundant in the low hills west of the Rio Grande, from Magdalena south (Ligon, 1916–1918.)] It breeds from the lowest altitudes as at Carlsbad, 3,100 feet (Ligon), Mesilla, 3,800 feet (Merrill), and at 4,700 feet near Hachita (Goldman), up to 7,500 feet near Taos (Bailey), and rarely to 7,800 feet on the Pecos River near Willis (Henshaw).

In the fall migration it remained in the southern part of the State near Old Fort Tularosa until October 2, 1906 (Bailey); one was seen October 21, 1907, in the



From Handbook of Birds of the Western United States

POOR-WILL

The soft-voiced bird of dusk and dawn, whose plumage has the exquisite bloom of the moths,
which also fly in the hours of shadow

southern Mogollons (Bergtold); one at State College October 30, 1915 (Merrill); and a very late bird November 24, 1889, near Apache (Anthony).

It does not winter in New Mexico, but arrived in spring migration at Apache April 6, 1886 (Anthony); State College, April 11, 1915 (Merrill); and Grant County, April 15, 1892 (Hartert). It does not usually arrive in northern New Mexico until the last of April or early in May. It was first noted April 16, 1913, near Beaver Lake at 8,000 feet (Ligon). [One was taken, August 21, 1920, two miles west of the Santa Fe Indian School and a few had been seen on the Pinyon Flats around Santa Fe (Jensen). In the south, it was rather common in the Animas Mountains, Grant County, May 1920 (Ligon), and a specimen was taken at the north end of the mountains, at 6,800 feet, May 8, 1920 (Kellogg).]—W. W. COOKE.

EGGS.—Usually laid on the bare ground, 2, white, unspotted or lightly marked.

FOOD.—The smaller night-flying moths, beetles, locusts, chinch bugs, etc. In one stomach, 80 per cent of the contents was grasshoppers and locusts.

GENERAL HABITS.—A Poor-will was heard by Mr. Bailey at Lake La Jara September 18, 1904, and one taken two days later at Dulce. When flushed from under a yellow pine the moth-like, mottled bird flew, to alight on a spot of bare ground behind a log where he was so well hidden that he was not discovered until he flew again. This time he was winged and went to the ground. When approached he gave a surprising exhibition of the defenses employed by his kind. As Mr. Bailey says, he "opened his mouth wide and hissed and blew and flopped about on the ground, always facing the enemy. Blowing like a blow snake and opening and shutting his mouth, he was enough to terrify all minor enemies. He was taken between five and six P. M. and his stomach was nearly empty, containing only two or three small hard insect heads and a gravel stone" (MS).

When hunting for food the Poor-will skims swiftly and noiselessly close over the ground with irregular turnings and windings and rests between, and when its catch contains hard indigestible parts like the wing coverts of beetles, ejects them in the form of pellets, as do the hawks and owls, kingfishers, and others of similar food habits. A road through a forest with its abundant flies and insects is said to be one of its favorite hunting grounds. A powerful arc light with its attracted swarm of insects has been accepted as a modern improvement, three of the birds at least being seen by Mr. A. Brazier Howell, hawking about an arc light in the railroad yards at Needles.

When in the Poor-will country in Colorado, Doctor Bergtold had an interesting experience. He says, "While motoring at night through a particularly dark canyon, I noticed far ahead in the illuminated road, two small glowing pink spots which were extinguished when a bird flew from the road on the near approach of the car. The bird alighted again, some distance ahead in the road, when the pink spots reappeared and were identified as the bird's eyes; it was shot and proved to be a Poor-will" (1916, p. 81). The same thing had been previously noted

with the nighthawks by Mr. George Shiras, 3d, in his study of the glow seen at night in the eyes of animals facing bright light.

The first day that we camped at Cuervo, on our way to the Staked Plains, a Poor-will was heard at intervals all day, probably because he was wakened by the musical but unaccustomed jangle of the horse bell, for after that he was silent until evening.

When we were camped on the edge of a canyon in the Guadalupe Mountains, at dusk while the bats were flying down in the canyon, up along the edge came the Poor-wills so near that we could hear their syllables distinctly—*poor-will'-uck*, *poor-will'-uck*. Sometimes two would call antiphonally, faster and faster till they fairly tripped over each other. The call as it is often given is a delightfully soft, *poor-will'*, *poor-will'*, *poor-will'-uck*, which like the delicious aromatic smell of the sagebrush clings long to the memory of the lover of the west.

NIGHTHAWKS: Subfamily Chordeilinae

The nighthawks, which are not strictly crepuscular, lack the long rictal bristles and have the plumage more compact than the goat-suckers, the wings extremely long, stiff, and pointed, the tail slightly forked, the feet weak, the hind toe short, the front toes connected by web, the middle toe long, its claw pectinated. The species show such individual variation as to complicate the problem of geographic forms and make identification of specimens difficult (Oberholser).



FIG. 57. Foot of Nighthawk

REFERENCE.—OBERHOLSER, H. C., U. S. Nat. Mus. Bull. 86, 1914 (monograph of Chordeiles).

WESTERN NIGHTHAWK: *Chordeiles minor henryi* Cassin

DESCRIPTION.—*Male*: Length about 9–9.5 inches, wing 7.3–8.2, tail 4.1–4.6, bill .2–.3, tarsus .5–.6, middle toe .5–.6 (female slightly smaller). *Adult male*: Upperparts mainly light grayish buffy or ochraceous, irregularly spotted, marbled, and vermiculated; tail dusky, crossed by bands of paler and by a broad subterminal band of white; wing with white or buffy band crossing five outermost quills about half way from tip to bend of wing; triangular throat patch white, bordered below by black; rest of underparts barred with dusky and tawny anteriorly, and buffy posteriorly; iris dark brown, bill black, feet gray. *Adult female*: Throat patch usually buffy, white of tail wanting, patch on wing restricted, upperparts lighter, underparts more buffy. *Young*: Similar to adult female but throat patch obscured, upperparts paler, and underparts less distinctly barred.

COMPARISONS.—Of the four Nighthawks found in New Mexico, the forms of *minor*—*henryi*, *hesperis*, and *howelli*—can be distinguished from *Chordeiles acutipennis texensis* by the position of the wing band, which is about half way between the tip and bend of wing in the three forms of *minor*; nearer tip than bend of wing in *texensis* (p. 346). Of the three forms of *minor*, *hesperis* (the Pacific) is darker than *henryi* (the Western), and *howelli* (the Howell), lighter. (See Comparisons under *howelli*, p. 346.)

RANGE.—Breeds from Arizona and southwestern Colorado south to mountains of Chihuahua and Sonora; winters in South America.

STATE RECORDS.—The type specimen of the Western Nighthawk was taken by Henry at Fort Webster, New Mexico, and named in his honor. It is one of the most widely distributed birds of New Mexico during the breeding season. It occurs throughout the State from the lowest hottest valleys, as at Carlsbad, 3,100 feet (Bailey); Fort Fillmore, 3,700 feet (Henry); Tularosa, 5,000 feet (Ligon); Hachita (Goldman); [Silver City, 5,800 feet, June 6, 1918 (Kellogg)]; near Taos, 7,200 feet (Bailey); Halls Peak, 8,000 feet (Barber); Tres Piedras, 8,000 feet (Gaut); [on Mount Taylor high mesa country, 8,000 feet, June 22, 1916 (Ligon)]; and in the Zuni Mountains, somewhat above 8,000 feet (Goldman). It is among the latest breeders at these altitudes since eggs have been taken June 24–25, 1903, on the Conchos River near Cabra Springs (Bailey); July 3, 1892, in the Animas Valley near the southern New Mexico line (Mearns); July 5, 1903, Canoncito (Bailey); July 8, 1913, near Santa Rosa (Ligon); and July 31, 1904, at Tres Piedras, where eggs were about ready to hatch (Gaut). [At Lake Burford in 1918, it was common, June 16, when the bulk

of the breeding birds arrived. On June 17 a number of pairs were seen and males were calling and booming excitedly (Wetmore). In the Pecos Valley, June 16–21, 1918, they were seen all the way between Roswell and Fort Sumner, but were common only in the vicinity of Roswell; between Carlsbad and Cimarron, May 27–June 22, 1924, they were frequently observed, and were common in the Pecos Valley and eastward. At Salt Draw, north of Roswell, a nest with two fresh eggs was found, May 30, 1920 (Ligon). In northern Santa Fe County they were common, nesting over the pinyon flats during the first half of June (Jensen, 1922).]

After the nesting season and during the fall migration, they range a little higher, to 9,400 feet in the Culebra Mountains August 18–25, 1904, occasionally to 11,400 feet where several were seen August 1, 1904, flying about in the Wheeler Peak Amphitheater of the Taos Mountains (Bailey); [over the summit of Lake Peak in the Sangre de Cristo Mountains at 12,600 feet (Jensen, 1922).] They all desert the State for the winter, beginning their southward journey soon after the middle of



From Biological Survey

FIG. 58. Nighthawk (*Chordeiles minor virginianus*)

The wing patches show high in the sky. Note the small figure (between the wings) making its headlong, booming descent

summer. They are most numerous in migration during August and have nearly all left by the end of September. One was seen at Roswell September 16, 1902 (Gaut); one September 18 near Burley (Hollister); one September 23, 1904, at Horse Lake (Bailey); and two on October 6, 1902, at Santa Rosa (Gaut).

On the return journey in the spring they are among the very latest migrants, seldom reaching northern New Mexico before May 10.—W. W. COOKE.

EGGS.—Laid on the ground, 2, creamy, olive-buff, or gray, profusely blotched or finely speckled with blackish, brownish gray, or lavender.

FOOD.—Ants in large proportion and also beetles which are the adult forms of noted pests. Specimens taken at Fort Stanton—caddice flies and gnats, together with injurious insects, including ants, plant bugs, leaf hoppers, crane flies, click beetles, wood-boring and engraver beetles, clover root weevils, and nut weevils.

GENERAL HABITS.—At Roswell, Mr. Ligon has often seen the Western Nighthawks sitting on fence posts and occasionally on the wires. During a month which we spent in the plains country between Santa Rosa and Mesa del Agua de la Yegua, the interestingly individual bird was one of the companions of our way, sometimes roused from its midday nap on the ground or a fence post, where it looked like a gray stick, to fly up and give its characteristic sharp *peent* and its raucous *pe-auk'* on the wing. When we were in camp, it was often heard booming in the daytime, the white crescent showing on its long pointed wings as it performed its surprising aerial maneuvers. As Major Goldman said of those he found in the Zuni Mountains, "before dark they fly rather high in the air, pitching headlong occasionally and making the noise which has led the Mexicans to call them 'zum-badores' or boomers" (MS). These "rapid headlong plunges," Doctor Townsend, in his interesting paper on Courtship in Birds (1920, pp. 380-393), classes as a form of dance, accompanied by the musical booming of the air rushing through the wing feathers. This booming, Doctor Wetmore writes, is attributed by some to a hole which the male is supposed to have in each wing and which he opens as he rushes through the air, so producing the loud whirring boom. After dark the Nighthawks fly closer over the ground, which probably accounts for the grasshoppers found in their stomachs.

These long-winged birds, Mr. W. L. McAtee says, are "so expert in flight that no insects can escape them. They sweep up in their capacious mouths everything from the largest moths and dragon flies to the tiniest ants and gnats, and in this way sometimes gather most remarkable collections of insects. Several stomachs have contained fifty or more different kinds and the number of individuals may run into the thousands" (Beal, McAtee, and Kalmbach, 1918-1927 ed., p. 36). But many are needed by a growing family of even two young.

Our first discovery of a nesting bird was not until June 24, and then on top of a three-hundred-foot butte facing the pine-clad Mesa Yegua. Here, on a stony flat, we flushed the parent and on hunting

closely were rewarded by discovering first one greenish finely speckled egg and then, two or three feet away, a second. Had the brooding bird, fearing danger, rolled her eggs apart or had she been so startled that she unintentionally rolled them apart in flying up? The next day we came on another brooding bird, but could discover only one egg. About a week later—July 4—we flushed a third Nighthawk, and this time, late as it was, found two eggs. While no nest is made, Major Bendire points out, a well-drained spot is selected for the egg, where the rains can not chill them or the young, a pretty instance of the way Nature's problems are worked out.

Nesting in exposed situations calls for all a mother's best protective tactics. A parent bird that was flushed by Mr. Gaut at Tres Piedras "flew about ten feet and then dropped to the ground with wings fluttering as though it had been wounded" (MS). And one that Major Bendire found incubating, after letting him approach so near that he could almost touch it, ruffled its feathers, and emitted a hissing sound somewhat resembling the spitting of an angry cat (1895, p. 169).

An eastern Nighthawk that Mr. F. H. Herrick watched feeding its young was first seen gyrating around overhead with its mate noisily swooping low and ascending again, the excitement of the young on the ground below increasing as the sound approached. Then after a thud, as if a clod of earth had dropped, the mother bird, crawling over the leaves, began calling *ke-ark, ke-ark*, as a hen clucks to her chicks, awakening an immediate response in one of the young who started to go to her. As he could not fly, she came to him—coming within fifteen inches of Mr. Herrick's hand with wings erect and full spread, at each utterance of her harsh *ke-ark* opening her great mouth, displaying the wide jaws and throat brilliantly aglow with the lights of fireflies!

Approaching her little one whose down-covered wings were also spread and aquiver, she put her bill well down into his throat and gave him a meal of fireflies, after which she tucked him under her breast and brooded him till time for the next meal (1901, pp. 81-82).

ADDITIONAL LITERATURE.—ALLEN, G. M., *Birds and Their Attributes*, p. 64, 1925.—BEAL, F. E. L., Educational Leaflet 1, Nat. Assoc. Audubon Soc.—BOWLES, J. H., *Auk*, XXXVIII, 203-217, 1921 (nesting).—MILLER, A. H., *Condor*, XXVII, 141-143, 1925 (boom-flight).

PACIFIC NIGHTHAWK: *Chordeiles minor hesperis* Grinnell

DESCRIPTION.—*Male*: Length 8.7-10.2 inches, wing 7.2-8.3, tail 4.2-4.7, bill .2-.3, tarsus .5-.6, middle toe .5-.6 (female slightly smaller); adult female, about 9.2 inches. Individual variation in color very marked, especially in the female. *Adult male*: Darker than *henryi*; regions of face and chest with *pale ochraceous* markings; white patches on throat, wings, and tail large; dusky ground color of *upperparts brownish black*; dorsal region extensively mottled, on wing coverts with silvery gray; belly with whitish cast. *Adult female*: Ground color of upperparts lighter and

posterior lower parts more buffy, tail without white band. *Young in juvenal plumage:* Ground color of upperparts brownish, light markings buffy and numerous.

RANGE.—Pacific coast district eastward to Rocky Mountains. Breeding from northwestern Washington, southeastern British Columbia, southern Alberta, and southwestern Saskatchewan, central Montana, and northeastern Wyoming south to Utah, Nevada, and southern California; migrating through Colorado, New Mexico, Texas, Arizona, and Mexico to Nicaragua.

STATE RECORDS.—Breeding from the Pacific east to central Montana and migrating through Mexico to its winter home in South America, it would be strange if the Pacific Nighthawk did not often cross New Mexico, spring and fall. Yet the only record so far known is that of one taken August 3, 1904, at Tres Piedras (Gaut).—W. W. COOKE.

FOOD.—One stomach shows an interesting collection of injurious insects—21 wood-boring beetles, 3 click beetles, 3 curculios, 1 grasshopper, 16 moths, and 5 stink bugs. The throat and gullet of one taken contained forty-three large winged white ants.

ADDITIONAL LITERATURE.—RAY, M. S., Condor, XIV, 14, 1912 (eggs).

HOWELL NIGHTHAWK: *Chordeiles minor howelli* Oberholser

DESCRIPTION.—*Male:* Length about 9.2-9.5 inches, wing 7.6-8.3, tail 4.1-4.7, bill .5-.6, tarsus .5-.6, middle toe .5-.6. *Adult male (type):* Upperparts brown, greatly spotted, mottled, and irregularly barred with brownish white, buff, and ochraceous; tail crossed by about seven irregular bars, all but middle feathers with subterminal white band; sides of head and neck dark brown, chin white, washed with buff, finely streaked and somewhat spotted, throat crescent pure white, bordered by brown heavily spotted with tawny; rest of underparts whitish, barred with brown, most thickly on lower breast; iris dark brown, bill black, feet gray. *Adult female:* Similar to male but usually more brownish and more mottled with ochraceous above, and more buffy below.

COMPARISONS.—The male *howelli* differs from *henryi* (p. 342), in lighter upperparts—more brownish, less blackish—the light markings finer and usually less deeply tawny or ochraceous; its lighter under parts less rufescent anteriorly and less deeply buffy, posteriorly. From *hesperis* (p. 345), it differs in having paler upperparts with more numerous light mottlings, and paler and more narrowly barred underparts. The female *howelli* differs from the female *henryi* in having lighter, more rufescent (less blackish) upperparts with paler, usually finer and more numerous markings, and by lighter throat and posterior underparts. The first autumn plumage resembles that of *hesperis* (p. 345), but is very much lighter above.

RANGE.—More southern portion of Great Plains and central Rocky Mountain districts of United States. Breeds from Wyoming and western Nebraska south to central Texas, northeastern New Mexico, and central Utah; migrates to eastern Nicaragua.

STATE RECORDS.—Specimens have been examined by Oberholser from Socorro (August 15, 1909, E. A. Goldman); Cuervo (June 13, 1903, V. Bailey); Cantonment Burgwyn (September 2, 1859); Sierra Grande (August 17, 1903).

TEXAS NIGHTHAWK: *Chordeiles acutipennis texensis* Lawrence

DESCRIPTION.—*Male:* Length 8.2-9.3 inches, wing 6.8-7.5, tail 4.1-4.2, bill .4-.5, tarsus .5-.6, middle toe .5-.6. *Adult male:* Upperparts light brownish gray, more or less tinged with buff, and mottled, vermiculated, and irregularly barred with brown-

ish black; tail mottled and irregularly and broadly barred with buffy, with white subterminal band; wing quills spotted or barred with tawny or buff, *white band crossing four outermost quills, nearer tip than bend of wing; triangular white throat patch large, bordered below by brown band, spotted with ochraceous*; breast dark brown, mottled and vermiculated with lighter; rest of underparts ochraceous buff with conspicuous dark brown crossbars. *Adult female*: Similar to the adult male but more tawny throat patch, tail band wanting and wing with tawny spots instead of white band. *Young*: Paler than adults, suffused with tawny on a pearly gray, black-speckled ground; but young male with white tail and wing spots.



FIG. 59. Wing of Texas Nighthawk

RANGE.—Breeds in Lower Sonoran Zone from central California, southern Nevada, southern Utah, and southeastern Colorado to southern Texas south to southern Mexico; winters south of United States.

STATE RECORDS.—The Texas Nighthawk comes into New Mexico in the southern parts of the State. It has been noted north to Deming and Lordsburg (Bailey), [common about San Simon, May 9, 1920, and northeast to Lordsburg, May 10 (Ligon)], and was seen at several places in the Animas Valley (Goldman), and at Dog Spring in Grant County (Mearns). It undoubtedly breeds at all these places, being confined to the lowest and hottest parts of the region it inhabits. It is a common breeder at Mesilla, 3,800 feet, and less common to 5,500 feet in the foothills of the Organ Mountains (Merrill). [It is abundant about Elephant Butte and Cuchillo and ranges as far north as Socorro in the Rio Grande Valley, to Tularosa in the Tularosa Valley, and to Lakewood in the Pecos Valley, nesting commonly (1916-18). It was heard at night, June 1, 1924, on the creosote hills eighteen miles north of Carlsbad (Ligon).]

It leaves the State in August and returns the following May. It arrived at Mosquito Springs, just south of the New Mexico line May 12, 1892 (Mearns), at Apache May 17, 1886 (Anthony), and at Palomas Springs May 6, 1913 (Ligon). [On May 18, 1919, six were seen 25 miles southeast of Silver City (Kellogg)].—W. W. COOKE.

EGGS.—Deposited on the bare ground; 2, clay-color to creamy, flushed faintly with pink, peppered with grays and lilac and coarser markings of brown and slate.

FOOD.—"Their food consists of almost any insects that may be out when they are. The stomach of one had a mass of mosquitoes and a small bug. Another contained one or more ground beetles, injurious click beetles, large leaf chafers, leaf hoppers, and green plant bugs, together with 150 winged ants" (Merrill MS). They also eat injurious moths, bill bugs, cicadas, and grasshoppers.

GENERAL HABITS.—The Texas Nighthawk is strikingly brown when near enough for one to see color, and when not its broader shorter wings with the white band nearer the wing tips than in the other nighthawks are enough to distinguish it from them. At Deming Mr. Anthony found it fairly swarming in June and July when it was doubtless nesting (1892, p. 362).

Professor Merrill writes that it is "found sparingly in the foothills of the Organs up to about 5,500 feet, a little more commonly in the Rio Grande Valley, mainly among the tornillos where there are uncovered interspaces, and in vast numbers on the mesa. There it

nests in profusion in June and July." As late as July 14, he took a fully formed egg from a female.

When twilight begins to fall, he says, "these birds start up into the air from everywhere and hawk high, far and wide, hundreds being in sight at once. As they pass close at times, one can hear them give occasionally a rather soft and tremulous *ku-e-r-r-r*. As darkness comes on they fly lower and lower, until they merely skim the ground and low bushes, often alighting for a moment, only to fly on at once. Later from all over the mesa comes their many-voiced chorus of calls. On moonlight nights they fly much at night, even. At other times they rest at night and start out again as soon as dawn begins and fly till broad daylight. Indeed, I have seen them over the valley, hawking high at ten o'clock in the morning. They arrive here about the first of May and most of them leave in October" (MS).

At Brownsville, Texas, hundreds of Texas Nighthawks are said to be found in the city nearly throughout the year nesting on the flat roofs of the adobe houses, while in southern California they are reported nesting in the vineyards, placing their eggs under or near vines.

ADDITIONAL LITERATURE.—VAN ROSSEM, A. J., Condor, XXIX, 25-28, 1927 (eye shine in birds).—WOODS, R. S., Condor, XXVI, 3-6, 1924.

SWIFTS AND HUMMINGBIRDS: Order Micropodiiformes

SWIFTS: Family Micropodidae

The Swifts which, like the Goatsuckers and Nighthawks, feed on aerial insects, have small, flattened bills, without bristles, but with gape reaching below the eyes; powerful chest muscles, wings extremely long, thin, and pointed; feet, used only for clinging against vertical surfaces, small and weak; plumage compact; sexes alike, and young little different. One of their most remarkable structural characters is the great development of the salivary glands. In most cases it forms a glue by which the materials of the nest are held together (Sclater).

REFERENCES.—OBERHOLSER, H. C., and F. M. CHAPMAN, Bird-Lore, XXVIII, 9-14, 1926 (colored plate XXVII, facing 377, 1925).—WETMORE, A., Condor, XXII, 197-199, 1920 (wing claw in swifts).

SPINE-TAILED SWIFTS: Subfamily Chaeturinae

NORTHERN BLACK SWIFT: *Nephoecetes niger borealis* (Kennerly)

DESCRIPTION.—Length: About 7-7.5 inches, wing 6.5-7.5, tail 2.3-3. Tail slightly forked in adult male, emarginate in female, and rounded in young, feathers soft with normal shafts; leg and toes naked, the hind toe pointing backward. Adult male: Mainly sooty-black, chin and throat lighter, wings and tail faintly glossed with bluish; forehead and crown hoary, lores velvety black, bordered above with whitish; iris dark brown, bill black. Adult female: Feathers of belly and under tail coverts tipped with white, which may be lost in greatly worn specimens. Young male in juvenal plumage: Plumage dull blackish, feathers tipped with white, especially noticeable on

rump and upper tail coverts; crissum almost pure white. Four years are supposed to be required to complete the adult plumage.

COMPARISONS.—Of the three swifts that have been found in New Mexico only the Chimney Swift has the spine-tipped tail. The White-throated, while having the same tail form as the Black, may be distinguished at a glance by the long white wedge of the throat and underparts and the white flank patches. (See pp. 351.)

RANGE.—Western North America and southward to southern Mexico. Breeds from southeastern Alaska and southern Colorado south to Mexico; winters in southern Mexico.

STATE RECORDS.—Since the Black Swift breeds in central Mexico and north to southern Colorado, it ought to nest in New Mexico, but as yet there is no record of the presence of the bird in the State during the summer. It has been noted twice in fall migration, once at Willis in September, 1883 (Henshaw), and once at Lake Burford September 28, 1904 (Gaut).—W. W. COOKE.

NEST.—Commonly in crevices of inaccessible mountain cliffs. Some in the Yosemite, found by Mr. and Mrs. C. W. Michael on canyon walls and behind or near a waterfall, thick or shallow round nests made of moss or pinnae of five-fingered fern; also a few found by Mr. A. G. Vrooman on sea-cliffs, on a shelf or bracket, a slight unlined depression in moist sod. *Egg*: 1 white, large.

FOOD.—Winged ants, in some cases 99 per cent; also alkali flies, etc.

GENERAL HABITS.—The Black Swifts, Major Bendire found to be "extremely social birds, rarely seen singly even during the breeding season." In southwestern Colorado, he says, in 1883 Mr. Anthony found them very abundant, "nesting in all of the highest crags, but never in places accessible to anything not provided with wings." On the upper Columbia, near Lake Chelan in July, 1879, the Major found quite a colony nesting in an almost perpendicular cliff, fully three hundred feet high. As he says, "they evidently had young, and the twitterings . . . could readily be heard as soon as a bird entered one of the numerous crevices in the cliff above." The nests must have been "placed well back in the fissures, as nothing bearing a resemblance to one was visible from either above or below" (1895, pp. 175-176). While the Swifts breed ordinarily in such localities, no actual nests had been discovered until, in the sea-cliffs of Santa Cruz, Mr. A. G. Vrooman found a small colony, and during a period of years, by examining the face of the cliff from a rope ladder, found the nests, the extraordinarily large, single eggs, and also the nestlings (1901, p. 395).

The Black Swifts evidently nest far within the Cascade Mountains in the region of Seattle, where their general habits and their daily flights to their feeding grounds in the valley below were carefully watched by Mr. Samuel Rathbun for a term of years. "On fair days," he says, the Swifts flew high—often to the limit of sight, and when it rained they would descend to a height of from two hundred to five hundred feet (1925, p. 501). In the Yosemite, Mrs. Enid Michael found them coursing back and forth through the mist of Vernal Fall,

often stopping to cling to the wet perpendicular wall of the cliff. Here they supported themselves by hooking their claws over some slight inequality, the entire tarsus resting firmly against the wall, so that the normal tail was left free instead of pressed against the wall as is the case with the spine-tailed Swifts which support themselves by both claws and tail (1926b, pp. 110-111). The old birds first fed the young at long intervals, then ten times in twenty seconds, feeding by regurgitation and to repletion.

The "low, melodious rolling twitter," which Mrs. Michael speaks of, may help to distinguish them at a distance from the white-throated Swifts whose notes are sharp and vibrant.

ADDITIONAL LITERATURE.—DAWSON, W. L., Condor, XVII, 8-12, 1915.—MICHAEL, CHARLES W., Condor, XXIX, 89-97, 1927 (photograph of young on nest).—MICHAEL, ENID, Condor, XXVIII, 109-114, 1926 (habits).—SMITH, EMILY, Condor, XXX, 136-138, 1928.—VROOMAN, A. G., Condor, VII, 176-177, 1905.

CHIMNEY SWIFT: *Chaetura pelagica* (Linnaeus)

DESCRIPTION.—*Length*: 4.7-5.5 inches, wing 5-5.2, tail (including spines) 1.9-2.1. Wings longer than bird; tail short, the *stiff spiny shafts projecting* beyond the webs; legs and feet naked, hind toe elevated, not reversed. *Adults*: Upperparts dark sooty olive, slightly glossy, and lighter on rump and tail; feathers of top of head darker centrally; underparts paler, grayish white on chin and throat; wings blackish; lores velvety black narrowly margined above with whitish; iris dark brown, bill black, legs and feet more or less livid. *Young in juvenal plumage*: Similar to adults, feathers of rump and upper tail coverts paler.

RANGE.—Breeds from central Alberta, southeastern Saskatchewan, central Manitoba, central Ontario, southern Quebec, and Newfoundland south to Gulf coast, and west to western border of Great Plains; winters south of United States, probably to Central America.

STATE RECORDS.—The normal range of the Chimney Swift extends west to central Kansas and eastern Texas. It was therefore a straggler which had wandered afar that was taken at Rinconada May 1, 1904 (Surber). [A straggling female was taken by Mr. Kellogg, May 22, 1921, on the Mimbres River, 30 miles southeast of Silver City, in Luna County].—W. W. COOKE.

NEST.—A wall pocket of twigs glued together and fastened to the inside of a hollow tree or chimney. Five found fastened to boards inside buildings (Sutton, 1925, pp. 586-587). *Eggs*: 4 to 6, white.

GENERAL HABITS.—The Chimney Swift of the Eastern States, which has been reported as a wanderer in New Mexico, is so familiar that its marvelous adaptations are treated as a commonplace. Two ends Nature has worked toward here—life in the air and against a vertical wall, and she has suffered no economic waste. Even camouflage is unnecessary here, for the long narrow blades of this aeroplane give it a swiftness that defies pursuit, and its hangar is secure against all enemies. Each detail of form shows stern selection for the two ends—food and home. The bill is all gape for snapping up aerial insects, the feet are mere hooks for hanging to the side of a wall, and the tail—

outdoing the woodpecker type—is tipped with sharp spines for bracing—to prop up the hanging body. And when it comes to nest building, a still more astonishing development is found, for the tiny twigs, snatched by bill or foot in passing, are firmly glued together by a remarkable saliva, a form of which produces what is known to epicures as the edible birds' nest from the far East. The fact that migrating Chimney Swifts roost by thousands in large hollow trees or great chimneys adds one more point of interest to the life history of this unique type of bird, of which even a rare wanderer is a welcome addition to the New Mexico list.

ADDITIONAL LITERATURE.—PEARSON, T. G., Educational Leaflet 49, Nat. Assoc. Audubon Soc.

TYPICAL SWIFTS: Subfamily Micropodinae

WHITE-THROATED SWIFT: *Aeronautes saxatalis* (Woodhouse)

DESCRIPTION.—Length: 6.5-7 inches, wing 5.3-5.9, tail 2.5-2.7. Tail moderately forked, with stiff and narrow but not spiny feathers; leg and part of toes feathered; hind toe directed either forward or to the side but not backward; front toes with slight basal webs. *Adults*: Upperparts blackish, with *white anterior underparts*, wing and rump patches, and lateral tail feathers; feet livid pinkish. *Young*: Similar to adults but black and white duller.



FIG. 60. White-throated Swift

RANGE.—Breeds from southern British Columbia, central Alberta, and Black Hills south to Guatemala and Lower California.

STATE RECORDS.—When Woodhouse crossed New Mexico in 1851 with Sitgreaves Expedition, he visited Inscription Rock and reported that Swifts were breeding abundantly in the crevices. In describing the species he gave it the appropriate name of *Acanthylis saxatalis*, rock dweller, but as he was unable to get a specimen nomenclaturists deprived him of the fruits of his discovery and employed a later name, *melanoleucus*. [Now, after 77 years, the same *saxatalis* is restored.] The species is common at suitable localities in the mountains through New Mexico. It was reported from Fort Wingate July 15 and September 11, 1892 (Hartert). It nests from about 5,700 feet near Anton Chico (Ligon); 6,000 feet as noted at Ribera July 2, 1903 (Bailey); and at 7,300 feet near Chloride (Ligon); to about 8,000 feet in the Capitan Mountains July 18, 1903 (Gaut); and at Halls Peak (Barber). [A specimen was taken thirty miles north of Silver City, June 19, 1918; two others, twelve miles north of Silver City, May 4, 1919, one carrying nesting material in a rocky canyon, and one fifteen miles southwest of Hachita, May 6, 1920 (Kellogg). In 1920 and 1921 quite a colony was nesting in the 300-foot perpendicular cliffs in Canyon el Diablo near Buckman in northern Santa Fe County. In June, 1921, a good-sized colony was found in the rim rock eighteen miles west of Santa Fe, but in 1922 only two pairs were left (Jensen). Near Lake Burford, in 1918, they were fairly common about sandstone cliffs in canyons, where they were breeding. In addition, from May 30 to June 4, flocks seemed to be still in northward migration (Wetmore).]

During migration or in its flights for food or sport the bird is likely to be found at almost any altitude even above 12,000 feet, as over the top of Pecos Baldy, where it was seen July 31, 1903 (Bailey). Migrants were seen at Lake Burford September 28, 1904, and at Largo Canyon, October 5, 1906 (Bailey). [Nine were noted October 4, 1916, near Zuni (Skinner)]; and the last migrant was noted October 9, 1889, at Cooney

(Barrell), where the first had been seen the previous spring on the early date of February 25.

It probably does not winter regularly in the State though it was found at Hachita as late as December 15, 1889 (Anthony).

In spring, it arrived March 22, 1913, at 6,600 feet on the East Gila River (Ligon). The northern part of the State is not usually reached until early April.—W. W. COOKE.

NEST.—In crevices of rock in cliffs, caves, quarries, or ruins; made principally of feathers instead of twigs, glued together with other soft materials and also glued to the rocks. *Eggs*: 4 to 6, white.

FOOD.—Winged ants and other hymenoptera, bugs, flies, dung beetles, engraver beetles, clover root weevils, leaf hoppers, etc.

GENERAL HABITS.—Besides the El Moro National Monument many of the loftiest cliffs and deepest canyons of New Mexico are associated with the white-patched forms of the White-throated Swifts, which, clean cut as arrowheads, dart through the sky at incredible speed, their peculiar, sharp, vibrant note filling the air. At Juan Tafoya they were seen around sandstone cliffs near an old cliff dwelling; later, around the vertical walls of the Enchanted Mesa and at Acoma numbers of them were flying across the face of the cliffs, appearing and disappearing in the long seams of the rock that doubtless furnish them with homes for their young.

At Lake Burford early in June, 1918, when Doctor Wetmore found them apparently stopping during their northward migration, they were seen circling high in the air and feeding over the flats. Near his cabin they joined a band of Violet-green Swallows that were coursing back and forth above the sagebrush, feeding on the swarms of chironomids driven in by the wind (1920a, p. 400).

In the fall migration we were stirred by the sight of a flock of the aeronauts, their rocky fastnesses left behind, high above a lake, winging their way across the sky to their distant southern homes.

In the Carlsbad cave region, Mr. Bailey often saw them passing over the entrance to the main cave, hurtling by "with lightning-like speed," perhaps on their way to Slaughter Canyon about fifteen miles to the west, where there was a smaller cave which a colony of Swifts had long shared with big-horned mountain sheep. The age of the colony was demonstrated by the amount of Swift guano accumulated, three car loads having been taken out, packed down the trail on burros, and shipped to California as fertilizer. A great crack in the roof some seventy-five feet above the floor seemed to offer safe nesting sites, but owls and ring-tailed cats, both common in the cave, had preyed upon them extensively, judging by the number of their bones found in owl pellets on the floor and "wing feathers with quills clearly cut by the teeth of some carnivore" (1928a, p. 149).

ADDITIONAL LITERATURE.—BAILEY, F. M., Condor, IX, 169-172, 1907.—BRADBURY, W. C., Condor, XX, 103-110, 1918.—HANNA, W. C., Condor, XI, 77-81, 1909; XIX, 3-8, 1917.—SWARTH, H. S., Pacific Coast Avifauna, No. 4, 16-17, 1904.

HUMMINGBIRDS: Family Trochilidae

Subfamily Trochilinae

Peculiar to America, the tiny, moth-like Hummingbirds, whose glittering iridescent color patches produce "the most gorgeously brilliant metallic hues known among created things," are called Hummingbirds from the humming sound made by the vibrations of their long wings—vibrations so rapid that in swift flights the form of the wing can not be distinguished as they whiz through the air in search of the flowers whose long tubes their needle-like bills and extensile tubular tongues enable them to probe for honey and insects (Lucas, 1891, pp. 169-172; Gardner, 1925, p. 21, pl. 10). Their remarkable flight, as with the Swifts, is made possible by long, thin-bladed wings, and powerful pectoral muscles. As their feet are used only for perching, they are small and weak, though the claws are large and sharply curved.

COMPARISONS.—The adult males of the eight hummingbirds found in New Mexico may be grouped by certain striking characters. Three have the *gorget elongated on the sides*—Rufous, Costa, and Calliope. Of these, Rufous (p. 362) is readily distinguished by its rufous color, and the Calliope (p. 366), by the conspicuous white bases of the feathers of its gorget. Two others have the *crown and back conspicuously different in color*. Of these, Costa (p. 355) is small and light colored, with entire head, gorget, and ruff amethyst, while the Rivoli (p. 368) is large and dark with crown purple, gorget green. Of the remaining six, *with crown and back the same color*, the Calliope and Rufous can not be mistaken, and three have *black or blue gorgets*—the Black-chinned (p. 354), the Broad-billed (p. 369), and the Blue throated (p. 370) —leaving only the Broad-tailed (p. 357), with its rose-pink gorget.

The adult females may be grouped by the colors of the tail. *Three have brown at base*—in Rufous on all the tail feathers, in Calliope on all but the middle pair, in the Broad-tail on only the 3 outer feathers. Furthermore, the female Rufous has rufous sides, and the female Calliope is much smaller than the female Broad-tail. Of the five remaining—in the Blue-throated the tail is black with white corners, in the Rivoli the four middle pairs of tail feathers are wholly green and the tail corners grayish or brownish; in the Broad-bill the two middle feathers are green and blackish (terminally), the rest green and blue-black tipped with grayish; in Costa and the Black-chinned the tails are green, black, and white, but in Costa the outer pairs of feathers have little if any green, while in the Black-chinned their basal half is green.

The light under tail coverts and the white thigh and rump tufts of the Hummingbirds, like their white tail tipplings, may add useful points of light to their plumage in a leafy landscape.

REFERENCES.—BASSETT, F. N., Condor, XXIV, 63-64, 1922 (bathing).—OBERHOLSER, H. C., and F. M. CHAPMAN, Bird-Lore XXVI, 108-112, 247-248, 398-400 (colored plates, facing 89, 231, 381), 1924; XXVII, 103-104 (colored plate facing 85), 1925.—RIDGWAY, ROBERT, Rep. U. S. Nat. Mus. for 1891, 253-383 (monographic).—THAYER, G. H., Concealing-Coloration in the Animal Kingdom, 103-105, 1909.

BLACK-CHINNED HUMMINGBIRD: *Archiflochus alexándri* (Bourcier and Mulsant)

PLATE 36

DESCRIPTION.—*Male:* Length about 3.3–3.7 inches, wing 1.7, tail 1.2, bill .7. *Female:* Length about 3.9–4.1 inches, wing 1.9–2, tail 1.2–1.3, bill .7–.8. Wing with six *inner quills abruptly narrower* than the rest, the *outside primary strongly incurved*; tail of adult male double rounded, of female, rounded; sides of rump with white tufts. *Adult male:* Upperparts, including top of head and middle tail feathers, dull metallic bronze-green; lateral tail feathers wholly purplish black; wings dusky, faintly glossed with purplish. *Gorget above opaque or velvet-black, below, a narrow band of metallic violet, or violet-purple, flashing blue and green and changing to black in striking contrast to white collar; rest of underparts, mostly whitish or grayish, greenish on sides.* *Adult female:* Upperparts dull metallic bronze-green, the head duller or grayish, *tail rounded*, middle feathers like back, lateral tail feathers with white tips, black subterminal bands, and *grayish or bronze-green bases (without brown);* underparts grayish or whitish, the throat sometimes marked with dusky. *Young male after the post juvenal molt:* Similar to adult female but feathers of upperparts tipped with buffy, underparts tinged with pale brownish, and throat generally marked with dusky and sometimes with a few iridescent purple feathers. *Young female:* Like young male but throat usually tinged with buff and upperparts more tipped with buffy than in adult.

COMPARISONS.—The adult male Black-chinned with his velvety black, squarish gorget bordered below by a narrow band of violet next to the white collar is readily distinguished from all our hummingbirds. The female might be confused with the female Costa, except for the large amount of green on the outer tail feathers in the Black-chin. The young male might easily be confused with the same age and sex of Costa, but in the Black-chinned the tail feathers are broader and have wider sub-terminal black bands (Chapman).

RANGE.—Breeds in Transition and Upper Sonoran Zones from southwestern British Columbia to northwestern Montana, south to central Texas, New Mexico, southern Tamaulipas, central Sonora, and northern Lower California; winters in western Mexico south to Colima, Guerrero, and Mexico.

STATE RECORDS.—The Black-chinned Hummingbird has been reported from only a few places in New Mexico, but these localities are so widely scattered as to make it probable that the species is more common in the State than the scanty records would indicate. [It was nesting at 4,500 feet at the Carlsbad Cave in 1924], was common at 5,000 feet on the Hondo west of Roswell June 9, 1899, and continued common to the foot of the Capitans at 6,000 feet (Bailey). It was noted June 23, 1904, at Espanola, 5,500 feet (Surber); was fairly common at Shiprock, 5,000 feet (Gilman); occurred and probably nested at Fort Wingate, 7,000 feet (Lucas); was common up to 8,000 feet in San Miguel County, breeding late in June (Mitchell); eggs were taken in 1876 at Fort Bayard, 6,000 feet (Stephens); one was taken July 28, 1908, at 5,100 feet, near the base of the Animas Mountains (Goldman); [it was noted at the north end of the Animas Mountains, May 8, 1920 (Ligon)]; and it was found common in 1892 along the New Mexican boundary near the San Luis Mountains (Mearns). Its center of abundance during the breeding season lies between 5,000 and 7,000 feet.

It does not winter in New Mexico, but returns by the middle of April and remains until late September.—W. W. COOKE.

NEST.—In trees or bushes, often near water 2 to 20 feet from the ground; made of plant down varying from white to sponge-colored, "agglutinated by the bird's



BROAD-TAILED HUMMINGBIRD

THE BROAD-TAILED HUMMINGBIRD

MALE

MALE

BLACK-CHINNED HUMMINGBIRD: *Archilochus alexandri* (Bourcier and Mulsant)

PLATE 36

DESCRIPTION.—*Male*: Length about 3.3–3.7 inches, wing 1.7, tail 1.2, bill .7. *Female*: Length about 3.9–4.1 inches, wing 1.9–2, tail 1.2–1.3, bill .7–.8. Wing with six *inner quills abruptly narrower* than the rest, the *outside primary strongly incurved*; tail of adult male double rounded, of female, rounded; sides of rump with white tufts. *Adult male*: Upperparts, including top of head and middle tail feathers, dull metallic bronze-green; lateral tail feathers wholly purplish black; wings dusky, faintly glossed with purplish. *Gorget above opaque or velvet-black, below, a narrow band of metallic violet, or violet-purple, flashing blue and green and changing to black in striking contrast to white collar*; rest of underparts, mostly whitish or grayish, greenish on sides. *Adult female*: Upperparts dull metallic bronze-green, the head duller or grayish, tail rounded, middle feathers like back, lateral tail feathers with white tips, black subterminal bands, and grayish or bronze-green bases (without brown); underparts grayish or whitish, the throat sometimes marked with dusky. *Young male after the post juvenal molt*: Similar to adult female but feathers of upperparts tipped with buffy, underparts tinged with pale brownish, and throat generally marked with dusky and sometimes with a few iridescent purple feathers. *Young female*: Like young male but throat usually tinged with buff and upperparts more tipped with buffy than in adult.

COMPARISONS.—The adult male Black-chinned with his velvety black, squarish gorget bordered below by a narrow band of violet next to the white collar is readily distinguished from all our hummingbirds. The female might be confused with the female Costa, except for the large amount of green on the outer tail feathers in the Black-chin. The young male might easily be confused with the same age and sex of Costa, but in the Black-chinned the tail feathers are broader and have wider subterminal black bands (Chapman).

RANGE.—Breeds in Transition and Upper Sonoran Zones from southwestern British Columbia to northwestern Montana, south to central Texas, New Mexico, southern Tamaulipas, central Sonora, and northern Lower California; winters in western Mexico south to Colima, Guerrero, and Mexico.

STATE RECORDS.—The Black-chinned Hummingbird has been reported from only a few places in New Mexico, but these localities are so widely scattered as to make it probable that the species is more common in the State than the scanty records would indicate. [It was nesting at 4,500 feet at the Carlshad Cave in 1924], was common at 5,000 feet on the Hondo west of Roswell June 9, 1899, and continued common to the foot of the Capitans at 6,000 feet (Bailey). It was noted June 23, 1904, at Espanola, 5,500 feet (Surber); was fairly common at Shiprock, 5,000 feet (Gilman); occurred and probably nested at Fort Wingate, 7,000 feet (Lucas); was common up to 8,000 feet in San Miguel County, breeding late in June (Mitchell); eggs were taken in 1876 at Fort Bayard, 8,000 feet (Stephens); one was taken July 28, 1908, at 5,100 feet, near the base of the Animas Mountains (Goldman); [it was noted at the north end of the Animas Mountains, May 8, 1920 (Ligon)]; and it was found common in 1892 along the New Mexican boundary near the San Luis Mountains (Mearns). Its center of abundance during the breeding season lies between 5,000 and 7,000 feet.

It does not winter in New Mexico, but returns by the middle of April and remains until late September.—W. W. COOKE.

NEST.—In trees or bushes, often near water 2 to 20 feet from the ground; made of plant down varying from white to sponge-colored, "agglutinated by the bird's



BROAD-TAILED HUMMINGBIRD

MALE

FEMALE

BLACK-CHINNED HUMMINGBIRD

RUFIOUS HUMMINGBIRD

saliva" and coated with spider web, occasionally with small leaves or oak blossoms on outer walls. *Eggs*: 2 or 3, white.

FOOD.—Small insects and honey from blooming flowers and shrubs, as the tree tobacco.

GENERAL HABITS.—The Black-chinned Hummingbird is said by Mr. Robert Woods to be "typical of the foothills and canyons of the less humid portions of the West." When sitting sunning himself on an oak twig he seems a very quiet body, for one of his intense, hot-blooded clan, but when showing off in courtship he has a pretty little animated aerial dance, swinging back and forth before his prospective seated mate, throwing himself back at the end of his line by a quick spread of the tail. His shuttling, as Mr. Woods explains, takes the form of a narrow figure 8 lying on one side (1927, p. 303). Like other hummingbirds in the nesting season, he will also dive from a height with gorget puffed out and tail spread spectacularly, making a loud whirring sound.

In nest building the females go through the usual process of molding the inside of the cup, molding like a potter shaping his cup, twirling tremulously around against the sides, sometimes pressing hard enough to ruffle up the feathers of the breast. To round the outside, the tiny builder will sit on the rim and lean over, smoothing the sides with her bill, often with the same tremulous motion. When wanting to turn around in the nest she will rise prettily on softly whirring wings.

Two and sometimes probably three broods are raised in a season. A Black-chin that Mr. N. K. Carpenter knew of for four successive years built a nest on an electric wire within six inches of a porch light. The current was on every evening but the light did not seem to disturb the sensible bird, who reared one family each season (1903, p. 20).

Two nests were found by Mr. Bailey, one in the great west entrance to the Carlsbad Cave and the other under the arched entrance to the Bighorn Cave, where the White-throated Swifts nested.

ADDITIONAL LITERATURE.—GRINNELL, JOSEPH, Univ. Calif., Publ. Zool., vol. 12, no. 4, 143-145, 1914.—HOLLAND, H. M., Condor, XVIII, 31, 1916 (unusual nest).—WUESTE, R. C., Condor, IV, 39-40, 1902 (nesting).

COSTA HUMMINGBIRD: *Calýpte cōstae* (Bourcier)

DESCRIPTION.—*Male*: Length 2.7-3.2 inches, wing 1.7-1.9, tail 1.1, bill .6. *Female*: Length 3.5-3.7 inches, wing 1.7, tail 1, bill .7. Adult male with tail slightly forked, adult female with tail nearly rounded; *outside tail feathers in male very narrow*. *Adult male*: Entire head, gorget, and long flaring ruff glittering metallic violet or amethyst-purple, changing to black, blue, green, or magenta in varying lights; rest of upperparts, including middle tail feathers, dull metallic bronze-green; lateral tail feathers grayish or brownish, glossed with green; wing quills dusky, faintly glossed with purplish; underparts whitish, belly gray, glossed with golden-green. *Adult female*: Entire upperparts, including middle tail feathers, dull metallic bronze-green, other tail feathers green or gray, black-tipped or white-tipped; underparts brownish

gray, whitish on throat, often with a few amethyst feathers. *Young male*: Similar to adult female, but feathers of upperparts more or less edged with buffy, tail double-rounded, and throat generally with a few amethyst feathers (in older ones similar feathers on crown). *Young female*: Similar to adult female but feathers of upperparts edged with buffy.

COMPARISONS.—The Costa is closely related to the Black-chinned but the females of Costa may be distinguished by normal instead of abruptly narrow six innermost primaries and round tipped instead of pointed tail feathers. (See *Comparisons* under Black-chinned Hummingbird, p. 354.)

RANGE.—Breeds in Lower Sonoran Zone (preferably in arid) from south-central California (casual to central California), southern Nevada, and southwestern Utah south to southwestern New Mexico, southern Arizona, and southern Lower California; winters from southern California and central-western Arizona to Sinaloa, Sonora, and Lower California.

STATE RECORDS.—The only record of the Costa Hummingbird in New Mexico is that of Frank Stephens, who in May, 1876, found one nesting on the Gila River, a few miles below Old Fort West. The species is common in California and Arizona, the above marking the easternmost limit of the range. It is a summer resident, retiring to Mexico for the winter.—W. W. COOKE.

NEST.—Usually 1 to 6 feet from the ground on cactus, in vines, bushes, palo verde, and other trees, often on a dead branch; loosely or compactly made mainly of plant down, weed leaves, and bits of flower stems, sometimes also pieces of string, attached to the supporting branch by cobwebs; lined with down and occasionally small feathers; ornamented with bits of bark, paper, etc. and bound with web and cocoon silk.

FOOD.—Insects found on plants and shrubs, as the squaw cabbage, milkweed, wild rose, sage, plum, and cherry and apricot blossoms.

GENERAL HABITS.—In southern California the Costa Hummingbirds are common among sage and "greasewood" on the low hillsides near small ravines, and also in eucalyptus groves. In Tucson, Arizona, Mr. and Mrs. Swenk had the pleasure of watching them in their yard about the blossoming apricot trees, and found a beautiful nest in a vine over the doorway of a friend (1928, p. 27).

The presence of the male, Mr. Woods finds, "is frequently announced by the two-or-three-syllabled whistling call with which he greets passing members of the tribe from his perch or salutes his mate as he hovers before her (1927, p. 301). Unlike the Black-chinned, Mr. J. B. Dixon says, the Costas "seem to enjoy each other's company, and it is nothing unusual to find them almost in colonies, as many as five nests being located in a radius of fifty feet in an unusually well situated grove of oaks." At other times rather quiet, at the beginning of the breeding season they are quite noisy, "chasing each other up, down, and around through the surrounding bushes and trees," squeaking sharply as they go. Like the Black-chinned and other hummers, the male Costa performs a remarkable aerial dance. "When he locates his mate sitting on a tree, or more often on a low bush," Mr. Dixon says, "he will ascend to an elevation of about one hundred feet and to one

side of the female and will then turn and swoop down at a fearful speed, passing perhaps within a few inches of the watching female and ascending in the air to complete a half circle. . . The noise that the male makes in doing his fancy dive is easily heard at some distance and quite often heard when the bird himself is not visible on account of the extreme speed at which he travels on his downward plunge" (1912, pp. 76-77). The arc of this "nuptial flight" is described by Mr. Woods as "an immense letter U" and he adds that the Costa "often ends his series of loops by darting away at high speed in an erratic, zigzagging flight" (1927, p. 302).

While male hummingbirds are almost never seen at the nest, on the Gila River Mr. Frank Stephens saw a male Costa actually helping to build. He says, "I distinctly saw him fly to a spider web and gather it in or on his bill while on the wing. He appeared to be winding it about his bill. . . When no more of the web was left in sight, he flew a few yards across the gulch, and I saw he was busy at the nest" (in Bendire, 1895, p. 203).

ADDITIONAL LITERATURE.—TORREY, BRADFORD, *Nature's Invitation*, 233-241, 1904.—WOODS, R. S., *Condor*, XXIV, 189-193, 1922; XXV, 195-198, 1923; *Auk*, XLIV, 297-314, 1927.

BROAD-TAILED HUMMINGBIRD: *Selasphorus platycercus* (Swainson)

PLATE 36

DESCRIPTION.—*Male*: Length about 4-4.2 inches, wing 1.9-2, tail 1.4-1.6, bill .6-.7. *Female*: Length 4.1-4.7 inches, wing 2-2.1, tail 1.4-1.5, bill .7. Male with outside wing quill narrowed and awl-like and recurved at tip; tail with 6 middle feathers about equal length in both sexes; tarsus mainly feathered. *Adult male*: Entire upperparts, including top of head and middle tail feathers, bronze-green; other tail feathers dull purplish or bronzy black, next to middle feathers usually glossed with green and some of them edged with brown; wing quills dusky, faintly glossed with purplish; gorget metallic deep rose pink or reddish purple; rest of underparts pale grayish, sides overlaid with green and flanks tinged with cinnamon; iris dark brown, bill dull black, feet dusky. *Adult*



FIG. 61. Tail of male Broad-tailed Hummingbird



FIG. 62. Tail of female Broad-tailed Hummingbird

female: Upperparts metallic bronze-green, including middle tail feathers which are sometimes dusky at tip; dusky portion wider on adjoining pair; three outer pairs brown at base, and broadly tipped with white, with purplish, bronzy, black and green between; throat whitish, with dusky or bronzy specks; rest of underparts more or less brownish white or buffy; sides brownish.

COMPARISONS.—The genus *Selasphorus* is closely related to *Archilochus* and *Calypte*, but in *Selasphorus* the tail, instead of being emarginate, is rounded or graduated, strongly rounded in the females and young. The Broad-tailed, Costa, and Calliope have somewhat similarly colored gorgets although that of Costa is more amethyst than pink; but the Broad-tailed

has no elongated ruffs as in Costa and Calliope and the top of the head is the same color as the back. (For females see Comparisons under Hummingbirds, p. 353).

RANGE.—Breeds mainly in Canadian Zone in mountains from southeastern Oregon, southern Idaho, and southern Montana south to Vera Cruz, Puebla, Valley



From Biological Survey

FIG. 63. Broad-tailed Hummingbird Twins
In their cozy lichen-covered nest behind our tent

of Mexico, and west to western Nevada; winters in Mexico from the States of Jalisco, Colima, and Mexico south to Guatemala.

STATE RECORDS.—Judged by the numbers of records, the Broad-tailed is the most common and widely dispersed breeding hummingbird in New Mexico. During the breeding season it seems to be mainly confined to the mountains. [It was seen in the Animas Mountains, May 7 and 8, 1920 (Ligon)]; and recorded from about 6,000 feet at Bernal (Bailey); Silver City (Marsh); [6,300 feet on Chloride Creek in the Black Range, 1920 (Ligon)]; 7,000 feet at Pecos (Bailey); [7,500 feet 45 miles northwest of

Grant, June 29, 1916 (Ligon); Lake Burford, 7,700 feet, fairly common May 23–June 19, 1918 (Wetmore); and Pecos (Bailey), to 8,000 feet at Agua Fria in the Zuni Mountains (Hollister); [8,000 feet in the Santa Fe Canyon (Jensen, 1919)]; 9,000 feet at Cloudcroft (Bailey); the same altitude in the Capitan Mountains (Gaut); the Sangre de Cristos in San Miguel County (Mitchell); and sometimes much higher, for one was found August 17, 1904, feeding young in the nest at 10,700 feet on Lost Trail Creek in the Culebra Mountains (Bailey).



MAP 14. BROAD-TAILED HUMMINGBIRD
Shaded areas show general breeding and migration range

During fall migration the species ranges much higher and in August, 1903, was seen on the summit of Pecos Baldy at 12,600 feet, while on July 26, 1904, an adult male was seen at 12,500 feet, and during the month another was found up to 12,700 feet on the side of Wheeler Peak (Bailey). At this time it also descends a little lower than the breeding range to 5,000 feet at Apache, where it was abundant (Anthony). August is the month of the main fall migration and few individuals are left in the State at the end of the month. Near Koehler Junction, it was very common on

August 11, 20, and 29, 1913 (Kalmbach). It was still present September 9, 1906, at 7,700 feet in the Jemez Canyon (Bailey); September 16, 1899, at Albuquerque (Birtwell); and at Luna September 6, 1908 (Birdseye); while it was noted until about September 10, 1903, in the Jicarilla Mountains (Gaut); one was taken in the Burro Mountains as late as September 18, 1908 (Goldman); and one taken on Truchas Peak at the very late date of September 24, 1898 (Birtwell).

On the return in the spring the arrival of the first was noted April 4, 1889, at Cooney, and April 10, 1890, at Carlisle (Barrell); also April 28 at Chloride (Ligon). The above given localities with the Guadalupe Mountains mark the eastern limit of the range of the species in New Mexico, whence it extends west into Arizona.—W. W. COOKE.

NEST.—Usually within 15 feet from the ground on branches of Douglas spruce, cottonwood, and other trees, often overhanging streams; made of cottony vegetable down coated with lichen, bark fibers, mosses, leaves, or plant fibers. Eggs: 2, white.

FOOD.—Insects found in flowers, as pentstemon, larkspur, agave, gilia, gooseberry, and on willow catkins.

GENERAL HABITS.—The Broad-tailed Hummingbird, with the deep rose gorget and green crown, is one of the most abundant birds of the New Mexico mountain region. Its characteristic machine-like clicking, suggestive of the buzz of the cicada, made, Mr. Henshaw explains, by the "attenuation of the outer primaries," was heard by us at all levels from the foot of the Sangre de Cristo Mountains at 7,400 feet up to 12,700 feet at the highest terrace on the side of Wheeler Peak where there was water; for during the season it follows the successively blooming flowers up the mountain sides.

When it first comes north, Major Bendire says, it is comparatively common in the lower foothills and valleys, where it raises its first brood, but by the time the young leave the nest the flowers of the lower levels are going out of bloom, so it goes up to the higher mountain parks to raise its second brood. By this time the first broods are "well able to take care of themselves and can be seen frolicking about everywhere." "These vertical migrations," Major Bendire adds, "frequently account for the entire disappearance of certain species in summer from localities where they have been exceedingly numerous a couple of months earlier, and the gradual diminution or actual scarcity of the food supply plainly accounts for the sudden change in their habitat" (1895, p. 211).

While wandering males were found during the fall migration up to 12,700 feet, in the Sangre de Cristos, a little later one was collected at 8,200 feet in Hondo Canyon. When picked up his bill was capped with the pink tube of a horsemint (*Monarda*), that was blooming abundantly at that level at the time, and whose color his gorget matched well in certain lights. The big greenish-yellow lousewort also seemed to be a favorite flower with *platycercus*, and we saw him frequently about purple larkspur, red pentstemon, and gilia. In the Sacramento Mountains at 9,000 feet we found the Broad-tails abundant the last of May

buzzing about the yellow gooseberry bushes where they were feeding. Besides their squeaky little song they gave some small staccato notes. "A rather faint, muffled staccato note," Mr. Woods says, "is uttered twice in quick succession at the lowest point of its vertically diving nuptial flight" (1927, p. 315). We saw the Broad-tails occasionally giving this flight the second week in July, darting up into the air and then shooting down again in true hummingbird form. Even the females, Major Bendire says, indulge in this display of surpassing wing power and exuberant vitality.

Migrating Broad-tails were heard by us on the edge of Espanola August 19, 1906, met with on the lower edge of the yellow pines of Santa Clara Canyon the next day, and found to be common along Santa Clara Creek to its head, on September 4. Two of their favorite feeding flowers, which give warm touches of color to the mountain meadows, the red gilia and pentstemon, were still in bloom. The birds showed their characteristic fondness for red, being attracted by anything of that color in camp. They were particularly abundant in the yellow pines, their machine-like rattle being frequently heard through the day. While there was a large number of noisy males, there was a still larger number of silent females and young, a few small enough to suggest *calliope*.

The Hummers were especially numerous at 8,000 feet along Santa Clara Creek and on the south pine slope just above it. I was puzzled at first to know what they found in the trees bordering the creek but, on August 25, being attracted by a brilliantly gorgetted male driving off an uncolored hummer, I saw him proceed to circle around a birch trunk banded by sapsucker holes. There were no insects visible at the holes at that time, but they were full of insect-attracting sap. The Red-naped Sapsucker was found among these same birches, suggesting that it had made the holes, though the Rocky Mountain Sapsucker was seen at the same level. The pink Cleome and a yellow composite were the two most abundant flowers in the bottom of the canyon at the time, and a Hummer was seen buzzing up to one of the pink Cleomes. At our 8,500-foot camp I saw a Hummingbird feeding from a dark purple aster. The throat of one taken was full of honey and gnats, explaining the use of the hummingbird tongue, cleft for about three quarters of an inch.

Near the head of the Red River, at 10,700 feet on August 17, I saw a female *platycercus* repeatedly light on a branch back of our tent, but it was so cold and wet in the canyon that I supposed she was trying to warm herself in the morning sun. In the afternoon, when going for dry under-twigs to encourage the camp fire, on a spruce branch only about four feet from the ground near the tent, I was amazed to find her nest, containing two big young. When I stood

gazing at them, she came and fed them close by, and later, when Mr. Bailey photographed them, she let him come within three feet of her. It was so late in the season and already so cold at that altitude we were afraid the belated little mother would not be able to get her brood down the mountain in time to save them.

On the Upper Pecos, in the Sangre de Cristo Mountains in 1883, Mr. Henshaw found the Broad-tails extremely numerous up to the first of August, when young birds were first noticed, but by the tenth there were none, and he concluded that immediately upon the young leaving the nest the males, warned of the approach of fall by the frosty nights and the decreasing supply of food, abandon their summer limits and at once set out for their winter quarters, to be followed not long after by the females and young; the young, probably because they have less strength, lingering last, being seen even after every adult bird has departed (1886, pp. 75-76). This fall migration was met with by Mr. Jensen on August 5, 1918, on a five-mile run by automobile in Santa Fe County, when he counted a hundred and nineteen Hummingbirds resting on telephone wires.

The Broad-tails are seen not only in the uninhabited mountains but occasionally in towns. On the campus of the Santa Fe Indian School Mr. Jensen found two pairs nesting in 1921 and 1922; and in front of a hotel in Rincon in 1920 Mr. Ligon saw one playing in the spray of a lawn sprinkler. An interesting account of one bathing in a swift-flowing mountain stream is given by Mr. Jensen in the Auk. He says: "On June 7, 1925, I spent the day in Santa Fe Canyon at an altitude of 8,500 feet. On crossing the little stream I saw a male Broad-tailed Hummingbird—*Selasphorus platycercus*—flying over the stream. I trained my field glasses on the bird and saw it settle down in the water with its body nearly half submerged and with the wings in motion as in flight. With the water rushing rapidly about the body of the bird, it remained stationary. The bird stayed in the water for a few seconds, made a short flight and then repeated the performance possibly half a dozen times. Sometimes it varied its tactics and with wings at rest would alight on a rock over which the water was flowing to a depth of one-half inch. I watched the bird about ten minutes, then it grew tired of the performance and flew away" (1925b, p. 588).

ADDITIONAL LITERATURE.—WETMORE, ALEXANDER, The Migrations of Birds, p. 108, 1926.

RUFIOUS HUMMINGBIRD: *Selasphorus rufus* (Gmelin)

PLATE 36

DESCRIPTION.—*Male*: Length about 3.2-3.7 inches, wing 1.5-1.6, tail 1.3, bill .6. *Female*: Length about 3.5-3.9 inches, wing 1.7-1.8, tail 1.2-1.3, bill .6-.7. *Adults*: Wing with outside quill narrow and awl-like, the tip bowed inward; tail with middle pair of feathers broad, pointed at tip, next to middle pair, strikingly nicked at

tip. (Females with characters less marked.) *Adult male:* *Elongated gorget brilliant metallic scarlet, orange, or golden-green; body mainly bright reddish brown, glossed with bronze-green on crown and sometimes back, and fading to white on chest; tail feathers rufous, with terminal dark mesial streaks; wing quills dusky, faintly glossed with purplish; iris dark brown, bill black, feet dusky.* *Adult female:* Upperparts metallic bronze-green, tail feathers with brown at base, *middle feathers bronze-green, more or less brown at base, next pair with more than basal half brown, then bronze-green, ending in purplish black, three outer pairs broadly tipped with white, widely banded with black, usually adjoined by green; throat and chest dull whitish, throat usually with a few brilliant feathers; sides shaded with rufous.* *Young male:* Similar to adult female but usually with more rufous in upper tail coverts and tail and a few glittering ruby feathers in the throat. Not fully mature males have a wash of green on the back. *Young female:* Similar to adult female but feathers of upperparts indistinctly tipped with brown or buffy, and throat spotted or streaked with bronzy, as in young male.

COMPARISONS.—The females of *rufus* and *platycercus* can be distinguished by the rufous sides in *rufus* and also by the coloration of the tail feathers in the two species. (See Comparisons, p. 353.)

RANGE.—Breeds in Canadian and Transition Zones from southern coast of Alaska (lat. 61°), southern Yukon, British Columbia, and western Alberta south to higher mountains of southwestern Montana, southern Idaho, and northwestern California; winters in southern Mexico, from Colima and Mexico south to Oaxaca; in migration east to Wyoming, Colorado, New Mexico, and central western Texas.

STATE RECORDS.—There seems to be no known instance of the Rufous Hummingbird nesting in Arizona, Colorado, or New Mexico though the species has been included in the breeding lists of these States for the last thirty years. In each of these States it occurs in fall migration and in New Mexico it is exceedingly abundant at that season. The fact that it is unknown in spring in both New Mexico and Colorado increases the probability that all statements of breeding are errors, based on the presence of the bird so early in the fall that it has been assumed that it must breed not far distant. Fall migration begins during what would be the nesting season for the related species *platycercus*, and the earliest record for New Mexico is that of one taken July 7, 1905, at Gallup (Hollister). Even this early date allows an abundance of time for the raising of the first brood, since the eggs are usually laid before the middle of May and sometimes as early as March. It is most probable, however, that these very early migrants are birds whose eggs or young have been destroyed. [A specimen was taken at Silver City, July 28, 1918 (Kellogg).] Though common in late July the species reaches the height of its abundance in early August, at which time it is common from about 5,000 feet as at Apache (Anthony), and the Little Florida Mountains (Goldman), to 12,600 feet over the saddle of Truchas Peak above timberline (Bailey). It was reported from Santa Fe in August, 1851 (Woodhouse). The early part of September finds many of the birds gone toward their winter quarters, but others remain a little later and were noted at Penasco to September 6, 1902 (Hollister); Willis, September 15, 1883 (Henshaw); [usually common in the Sangre de Cristos in late August and September and several seen during spring and summer (Jensen, 1925 and 1926)]; in the Burro Mountains, September 18, 1908 (Goldman); at Magdalena September 16, 1899 (Fitch); and at Albuquerque until September 21, 1899 (Birtwell).—W. W. COOKE.

NEST.—In bushes, as in salal and cinamox, in trees (on dead spruce limbs covered with lichens), and in ferns, or vines overhanging embankments; made of down and decorated with fine mosses, lichens, and shreds of bark. *Eggs:* 2, white.

FOOD.—Insects found on wild currant and gooseberry bushes, ocotillo blossoms, fire-weed, paint brush, gilia, pentstemon, and agave flowers.

GENERAL HABITS.—The brilliant Rufous Hummingbird, glancing red and gold as he passes, is known to the Taos Indians as the sun-bird; the more quietly tinted Broad-tailed, being called by them the Flower-bird. Sun-Elk told us that he had seen *rufus*—"the Red Hummingbird"—in the yellow pines on the hills above Pueblo Canyon and sometimes as low as the Pueblo. On August 6, 1904, he found one "red one" with about ten "green ones" near timberline on Lake Fork, feeding from red flowers, and secured one of the females. A few days later an adult male was found in Hondo Canyon at about 8,350 feet. No more were seen until we descended to 7,900 feet where Hondo Canyon widens into a little valley before opening into the Rio Grande. Here, between the cultivated fields of the Mexicans and the brushy south wall of the valley were beautiful wild flower gardens, patches of red castillejas, lavender lupines, and pink monardas. This garden strip was fairly squeaking with hummingbirds, "red" males in brilliant plumage chasing one another about in characteristic *rufus* fashion. When not buzzing about the flowers, darting after a neighbor through the air or in and out of the bushes, or resting quietly on the willows bordering the irrigation ditch, one would sometimes sweep out over a corn field and circle back, flashing by like a gleaming coal of fire.

A patch of thistles on the edge of a wash near Pecos, on August 25, 1903, was alive with hummingbirds, mostly females and young, about thirty being seen at one time. An immature male Calliope and two young Broad-tails were secured, and an adult male Rufous recognized.

In the Animas Mountains, Major Goldman found the Rufous by far the most abundant of the hummingbirds, where it was generally seen "hovering about agave flowers between 5,500 and 6,000 feet altitude. After probing the flowers a few seconds," he says, "the bird usually darts away with a buzz and a sharp and distinct rattling noise, but occasionally one may alight for a rest on a nearby branch, dead limbs apparently being preferred. An adult male was observed working on the flowers of a large agave and when a smaller hummer approached he was instantly pursued and driven off by the *rufus*, which returned in a second or two and alighted on a dead branch of a low bush, where he remained sitting quietly for several minutes, turning his head and peering in all directions" (MS).

In the southwestern part of Grant County in 1886, Mr. Anthony noticed none of the Rufous Hummers until the last of July, when the first mesal blossoms appeared; but early in August when the mesal was in full bloom they came by the hundreds. "The blossoms of the agave were considered the especial property of *rufus*, nor were his rights often contested. If an unfortunate Broad-tail or Calliope

happened to be feasting upon a choice bunch of flowers when a Rufous appeared upon the stage, his angry demand to vacate was seldom ignored" (1892, p. 363).

On the Upper Pecos, in 1883, Mr. Henshaw found the Broad-tailed and Rufous Hummers from about 7,500 feet far up on the mountain sides, as high up as suitable flowers afforded them means of subsistence, though they were most numerous from 8,000 to 9,000 feet. They frequented almost exclusively a species of red *Scrophularia* that grows in clumps in certain spots in the valleys, and upwards of fifty birds could often be counted within the area of a few yards in these flower patches. As he wrote—"From early dawn till dusk the humming-birds throng around these plants intent in surfeiting themselves on honey and the minute insects that the honey attracts. Males and females all flock to the common feeding ground, and as the hummers, especially the Rufous-backed, are pugnacious and hot-tempered in the extreme, the field becomes a constant battle-ground whereon favorite flowers and favorite perching grounds are contested for with all the ardor that attaches to more important conquests" (1886, p. 76).

On their nesting grounds the interesting courtship display of the Rufous has been carefully watched and graphically described by Mr. G. D. Sprot. As the brilliant male swung up in the air, he tells us, the female was "sitting motionless on some twig of the low-growing underbrush, and as the aerial acrobat reached the limit of his upward flight she was seen to turn her head slightly and glance admiringly aloft. The male ascended usually with his back towards his mate, then turning, faced her, and with gorget fully expanded descended swiftly until within an inch or two of her, when spreading both wings and tail he checked himself and soared aloft again to repeat the performance, or else settle on some nearby bush. As he checked his flight the whining note was produced, undoubtedly by the rush of air through the outspread feathers (1927, pp. 71-72).

In the nesting season of the Rufous in Alaska, Mr. Alfred M. Bailey had a most unusual experience. He says—"I was walking along the base of a precipitous cliff when I noticed the handsome little male hovering over my head about twenty feet up, and was then surprised to see him climb into a nest, in the terminal branches of a drooping spruce. When incubating, the little male squatted far down in the nest, with tail and beak pointed almost vertically, and he proved so tame that I believe I could have touched him" (1927, p. 353).

ADDITIONAL LITERATURE.—DU BOIS, A. D., Condor, XXV, 157-159, 1923 (experiment).—FINLEY, W. L., American Birds, 3-12, 1907; Condor, VII, 59-62, 1905.—GILLILAND, MRS. FRANK, Bird-Lore, XXIX, 171-172, 1927 (a pet).—KOBBE, W. L., Auk, XVII, 8-15, 1900.

CALLIOPE HUMMINGBIRD: *Stellula calliope* (Gould)

DESCRIPTION.—*Male*: Length about 2.7–3 inches, wing 1.5–1.6, tail .9–1.1, bill .5–.6. *Female*: Length about 3.5 inches, wing 1.7–1.8, tail 1.1, bill .5–.6. *Tail with middle feathers broadest near tip; leg partly feathered. Adult male: Upperparts including top of head metallic bronze-green, but tail feathers dusky, usually with paler*



From Smithsonian
(Robert Ridgway)

Fig. 64: Calliope Hummingbird

The wings move so fast they show only hazily

tips and more or less brown at base; wing quills dusky, very faintly glossed with purplish; *gorget with feathers narrow, much elongated posteriorly; metallic reddish purple (solferino) with conspicuous white bases; chest whitish, rest of underparts grayish washed with brownish buff and green; iris dark brown, bill black or dusky, under mandible flesh-color in life, feet dusky. Adult female: Upperparts metallic bronze-green, middle tail feathers duller, sometimes with dusky tips; others decreasingly green (or gray), crossed with black, and from the third pair tipped increasingly with white, bases slightly marked with brown; throat dull brownish white usually streaked or flecked with dusky or bronzy; median underparts buffy or dull whitish, sides and flanks cinnamon or buffy. Young male: Similar to adult female but generally with more rufous in the tail and one or more metallic purplish red feathers in the throat. Young female: Similar to adult*

but upperparts more bronzy, with feathers tipped with brown or buff.

COMPARISONS.—The white bases of the feathers of the gorget distinguish the adult male Calliope at sight. The female is one of the three in New Mexico which has brown at the base of the tail. (See Comparisons under Hummingbirds, p. 353.)

RANGE.—Breeds in upper Transition and Canadian Zones in mountains from southern British Columbia, southwestern Alberta, and Montana south to central-western Wyoming, southeastern Idaho, central-western Nevada, and Lower California; winters in southern Mexico to Michoacan, Guerrero, and Mexico. In migration occurs in Colorado, New Mexico, and Texas.

STATE RECORDS.—There is no sure record of the nesting of the Calliope Hummingbird in New Mexico, nor any note on its occurrence there in the spring. It seems to be confined to the fall migration and the same is true of the whole Rocky Mountain region south of the regular breeding range in southern Idaho and northwestern Wyoming. The earliest date of observation in New Mexico seems to be July 15 in 1886, when the first was seen at Apache, soon after which it became abundant (Anthony). It was seen in the San Luis Mountains July 20, 1892 (Mearns), at Inscription Rock July 23–24, 1873 (Henshaw), and becomes abundant in the mountains of northern New Mexico about the first of August. Apparently the males migrate before the females, for at Willis in 1883 up to August 10 the males had been at least ten times as numerous as the females (Henshaw); in Hondo Canyon at 8,200 feet, August 8–9, females were taken (Bailey)

The range in altitude is from about 5,000 feet at Apache and 6,500 feet on the Pecos (Surber), to 11,400 feet on Wheeler Peak, where one was seen July 30, 1904 (Bailey). The most eastern record in the United States is that at Sierra Grande, where the species was found abundant on the mountain from base to summit, August 10–22, 1903 (Howell). The State is deserted in September, the latest record being that of three birds taken at Albuquerque September 16, 1899 (Birtwell).—W. W. COOKE.

NEST.—“In the Canadian or Transition Zone, placed near the end of a lower limb of a coniferous tree, usually overhanging a stream or at the edge of a forest opening. Compactly made of plant down, held in shape by a framework of green moss bound together by spider web and insect cocoon fibers; exterior protectingly colored with a thick layer of lichen scales” (Weydemeyer). *Eggs*: 2, white.

GENERAL HABITS.—Like the Broad-tailed, the charming little Calliope, one of our smallest United States hummingbirds, is a mountain-loving species, rarely breeding below 4,000 feet and found more often between 6,500 and 8,000 feet. At Sierra Grande, where Mr. Howell found it abundant, it was especially numerous about the mountain meadows near the summit, where paint brush and lupines abounded.

In the Taos Mountains, at our Wheeler Peak camp of 11,400 feet altitude, as I was standing beside the tent, one of the tiny hummers, with the flaring rose-purplish and white-streaked gorget, lit on a willow twig only nine or ten feet from me and began preening its wet feathers. After deftly dressing its wings and tail it rose, and first flying a few feet toward me to investigate my red cap, turned and flew softly away—in striking contrast to the noisy Rufous and Broad-tailed. In the Hondo Valley on August 10, among the wild flowers bordering the fields, one adult male was seen with a noisy band of Rufous Hummers, while there were a number of little green females or young quietly moving about the flowers and bushes which we took for Calliopes.

The interesting fact of the usual absence of the noisy, brilliantly colored male hummingbirds from the nesting ground, presumably for the protection of the young, was attested by Doctor Grinnell in his study of the Calliope. “Only on one or two occasions,” he says, “did I ever see a male invade the canyon bottom where the female was nesting, and then he was routed out by the irate mother. There were, however, neutral tracts on the upper slopes, red with castillejas and pentstemons, where the males and females were seen together” (1908, p. 74).

At Antonito; just across the Colorado line, late in August, several hummingbirds were found on the telegraph wires and in the small cottonwoods below—one Rufous and several Calliopes. A young male Calliope with touches of rose feathers in his gorget was flying up in the air and swooping down sometimes almost hitting a second one sitting on the fence. Unlike any other hummingbirds I had ever seen go through this aerial dance, in doing this the only noise made was a slight seething sound, as of the air through the wings. But the flight of Calliope, Mr. Woods states, is at times characterized by “a shrill, strident quality” not heard from other familiar hummingbirds. He also attests that the male produces at will “a loud buzzing like that made by a large fly entangled in a spider’s web” (1927, p. 301). Its attenuated, squeaky notes, Doctor Grinnell says, although faint and difficult to locate, have a quality all their own (1908, p. 73).

A most interesting nest of the little Calliope, on exhibition in the National Museum, is one of those which Major Bendire describes as "marvels of ingenuity . . . mimicking a small dead pine cone so perfectly as to almost defy detection, unless one sees the bird fly on or off the nest" (1895, pp. 220-221). Calliope is said to build in the same tree for several years in succession. A birch and maple draw, Mr. Munro has found, is one of its favorite homes (1919b, p. 71), and here six or eight may be seen buzzing around a birch tree which a Red-naped Sapsucker has girdled. In the contests of its larger neighbors, Rufous and the Broad-tailed, Mr. Henshaw noted, it takes no part, when assailed, at once darting away to another spot, where it can feed without molestation (1886, p. 78).

ADDITIONAL LITERATURE.—WEYDEMEYER, WINTON, Condor, XXIX, 19-23, 1927.

RIVOLI HUMMINGBIRD: *Eúgenes fulgens* (Swainson)

DESCRIPTION.—*Male:* Length 4.5-5 inches, wing 2.9-3.1, tail 1.9-2, bill 1-1.2. *Female:* Wing 2.6-2.7 inches, tail 1.7-1.9, bill 1-1.1. Tail deeply emarginate in adult males, slightly emarginate or double-rounded in females, the feathers with rounded tips; *legs partly feathered.* *Adult male:* Top of head metallic violet or royal purple, sides of head and hind neck velvety black or green in different lights; gorget brilliant metallic emerald-green, chest, velvety black at some angles, bronze-green in others; rest of body mainly green, including tail, the tail feathers sometimes grayish at tip; wing quills dusky, faintly glossed; belly and flanks brownish or grayish; a white spot or streak behind eye; iris dark brown, bill dull black, feet dusky. *Adult female:* Upperparts, including four middle tail feathers, metallic bronze or green, the head duller; three outer tail feathers green at base, three black, tipped with grayish or brownish; underparts brownish or buffy grayish, sides glossed with metallic bronze or green; feathers of chin and throat with scaled appearance. *Male in juvenal plumage:* Intermediate in coloration between adult male and female, the crown partly violet, the throat partly green, and chest slightly mixed with black, the tail intermediate in form and color. *Young female:* Similar to adult female, but feathers of upperparts tipped with buffy.

COMPARISONS.—The rare Rivoli, Blue-throated, and Broad-billed hummingbirds, which cross the New Mexico border from Mexico, may be grouped by themselves. Largely green, black, and brown, they have dark blue or green gorgets which contrast strikingly with the pinks and reds of the more abundant United States hummingbirds. Of the three, the Rivoli may be known by its green gorget, the blue-throated and Broad-billed by blue gorgets, and the Broad-billed by its partly carmine bill (in both sexes). The females may be distinguished by their tails. (See Comparisons under Hummingbirds, p. 353.)

RANGE.—Breeds in Upper Sonoran Zone in mountains of southern Arizona, southwestern New Mexico, and Tamaulipas south through central Mexico and Oaxaca to Guatemala and Nicaragua; winters in the southern part of its range, north at least to central Mexico.

STATE RECORDS.—In the summer of 1892, from June 26 to July 23, Mearns found the Rivoli Hummingbird in the San Luis Mountains at about 6,500 feet on both sides of the New Mexico boundary. It was, of course, breeding, though no nests were seen. This is the northeastern limit of the range of the species.—W. W. COOKE.

HUMMINGBIRDS: BROAD-BILLED HUMMINGBIRD 369

NEST.—In small sycamore or maple (Willard), and red fir 50 feet from the ground (Howard). (Two found by Henshaw and Price) in alder and walnut, 20 and 10 feet from the ground; made of mosses, covered with lichen fastened with spider webs, and of silky plant fibers coated with lichen and lined with down and one or two feathers. *Eggs*: 2, white.

FOOD.—Small insects, found on honeysuckles, agaves, and other plants.

GENERAL HABITS.—The flight of the Rivoli is erratic at times, Mr. F. H. Fowler says, like that of a hummingbird moth or of a bat, and it even soars or sails occasionally, for a few feet (1903, p. 107).

An interesting account of a young Rivoli and its mother is given us by Mr. F. C. Willard. The young one was discovered after a heavy rain on the ground nearly drowned. Warmed in the hands it soon revived and was fed with honey on the tip of a toothpick. The anxious mother followed it into the house and after a little hesitation "alighted on the tip of the fingers of the hand which held the youngster, and fed it" (1909a, pp. 102-103).

ADDITIONAL LITERATURE.—HOWARD, O. W., *Condor*, II, 101-102, 1900 (nesting).

BROAD-BILLED HUMMINGBIRD: *Cynánthus latiróstris* Swainson

DESCRIPTION.—*Male*: Length about 3.5-3.7 inches, wing 2-2.2, tail 1.3-1.5 (forked for .2-.3), bill .7-.8. *Female*: Length 3.8-4.1 inches, wing 2-2.1, tail 1.2-1.3 (forked for about .1), bill .8. Bill wide at base, slightly decurved; tail deeply emarginate or forked in male, slightly emarginate in female, middle feathers broad, obtuse, lateral ones narrower. *Adult male*: Gorget bright metallic greenish blue or bluish green, rest of head and body metallic bronze-green; tail glossy blue-black or steel-blue, four middle feathers tipped with gray; wings dusky, faintly glossed with purple; iris dark brown bill purplish red or carmine, dusky at tip, feet dusky. *Adult female*: Upperparts green, with grayish or brownish on head; tail with middle feathers bronze-green passing into blackish terminally, other feathers with about basal half bronze-green, the rest blue-black tipped with grayish (most broadly on outer pair); wing quills grayish brown; underparts gray, sides of chest glossed with green; a white streak back of eye bordered below by dusky, iris dark brown, bill reddish at base, feet dusky. *Male in juvenal plumage*: Similar to adult female but feathers of upperparts tipped with buffy or rusty; tail as in adult male; chin and throat with some metallic purplish blue feathers tipped with brownish. *Young female*: Similar to adult female but more rusty above.

RANGE.—Little known. Found in summer in southern Arizona and from northern and central Mexico south to Vera Cruz, Mexico, and Guerrero; winters at least in the southern part of its breeding range.

STATE RECORDS.—When Mearns was collecting along the southern boundary of New Mexico, on August 31, 1893, he took a specimen of the Broad-billed Hummingbird on the Guadalupe Mountains (Cloverdale range) in the extreme southwestern part of the State, and this is the only record of the bird for New Mexico. As the species is known to breed a hundred miles to the westward in the Huachuca Mountains of Arizona, it is, of course, possible that it breeds in the Guadalupe Mountains, but the fact that it has not been found by subsequent collectors and the further fact that it is not known to occur at any time of year in the neighboring Chiricahua Mountains, make it probable that the specimen taken by Mearns was merely a wanderer migrating from its breeding range in Arizona.—W. W. COOKE.

NEST.—One in National Museum was saddled on the fork of a slender, drooping twig, loosely made of rather coarse materials for a hummingbird—shreds of bark and plant fibers, mixed with down, and decorated with narrow strips of bark, fine plant stems, and bits of lichen, coated with spider webs. One found by F. C. Willard in the Huachuca Mountains of Arizona at 5,400 feet, and others by O. W. Howard in the Catalinas at 6,000 feet in bushes over or near water, "ragged looking," with cobweb-hung bits of bark and leaves dangling from them; made of down from oak, sycamore or other leaves, and lined with fine rootlets (MS). Eggs: 2.

GENERAL HABITS.—The Broad-bill from Mexico, found in southern Arizona by Mr. Stephens, was always near water, usually in high mountain canyons, where it perched on dead twigs of sycamores.

Between the Rincon and Santa Catalina Mountains, Mr. A. B. Howell states, on March 13, 1916, "the Broad-bills began to arrive, and after that two or three were almost always to be seen in a small sheltered patch of mesquite near the mouth of one of the canyons. They favor the top twig of a tree and are rather conspicuous . . . but quite shy." Their long tails, Mr. Howell finds, "are especially noticeable whether they are at rest or on the wing, and while in flight give them a decidedly 'bottom-heavy' appearance" (1916, p. 212).

The color of the bill astonished me on my first meeting with them in the Santa Rita Mountains of Arizona. As I noted, the "wide bill was *livid Turkey-Vulture carmine*, the under mandible especially so, the upper mandible being blackish at tip." When watching a female building, Mr. Francis C. Willard found that, "when sitting only about three feet from the nest, the red bill was the one field mark by which the bird could be told" (MS). The *ocotilla* slopes on the foothills of the Santa Rita Mountains, as we found, afforded choice feeding grounds for the Broad-bills, who appropriately probed the red, stamen-fringed flower tubes with these carmine bills (1923a, p. 407). In dried museum skins these colors fade beyond recognition and so are not mentioned in some of the books. The meeting with the live birds was a striking lesson on the importance of careful field notes on all colors that fade—bills, feet, and all the soft parts.

The courtship "pendulum swing back and forth in front of a female," when given by the Broad-bill, Mr. Willard says is "higher pitched than that of any of the other small hummers," having "the 'zing' of a rifle bullet" (MS). It is of peculiar interest to hear from Mr. O. W. Howard that while in Arizona he saw several of the male Broad-bills in the vicinity of their completed nests.

ARIZONA BLUE-THROATED HUMMINGBIRD: *Lampornis clemenciae*
bessophilus (Oberholser)

DESCRIPTION.—Length: About 4.5–5.4 inches, wing 2.9–3.2 (extent 7.5 Coues), tail 1.8–2.2, bill .8–1; tail long, with broad feathers, slightly emarginate in adult male, slightly double-rounded (with outside feathers shorter than middle pair) in adult female; *tarsus mainly feathered*. Adult male: Upperparts dull metallic bronzy green,

rump with feathers tipped with grayish, *tail dull bluish black, lateral feathers tipped with white*; wings dusky, faintly glossed with purplish; *side of head with conspicuous, white streak* back of eye and one from bill (sometimes obsolete); *gorget metallic blue* rest of underparts light brownish gray, breast and sides washed with greenish, *under tail coverts broadly edged with white*; iris dark brown, bill dull black, feet dusky. *Adult female*: Similar, but throat like underparts. *Young male*: Similar to adult but with more bronzy gray-margined upperparts.

RANGE.—Southwestern United States and Mexico. Breeds in mountains of southeastern Arizona, southwestern New Mexico, central-western Texas, and south to Chihuahua; winters south to southeastern Mexico (Vera Cruz).

STATE RECORDS.—The Arizona Blue-throated Hummingbird was added to the fauna of New Mexico by Mearns who took specimens July 11 and 12, 1892, at Lang Ranch in the San Luis Mountains on the New Mexico side of the boundary. He had found the species two weeks earlier in the same mountains just south of the line. It ranges over much of Mexico and in the San Luis Mountains finds its extreme northeastern limit.—W. W. COOKE.

NEST.—The few reported, among ferns in a small shrub, on an old Black Phoebe's nest, or hung in hooks of wire were made of down or oak blossom hulls and stems, tied together with cobwebs and cocoon silk. *Eggs*: 2, white.

FOOD.—Insects from flowers of the shrubby honeysuckle, gilia, agave, and other plants.

GENERAL HABITS.—The large Blue-throated Hummingbirds, "distinguished for the quietness of their coloring" come into New Mexico in the San Luis Mountains, but are better known in the mountains of southeastern Arizona. In the Huachucas Mr. F. C. Willard found them in narrow, deep canyons, and later, in a small greenhouse in Ramsay Canyon. A female nested persistently in the same spot—the crook of the handle of an old lard pail—on a hook. He took the hook with one nest that had at least four stories, and when he replaced it with another hook, he says, he "had the pleasure of photographing the young raised in a nest built on it" (1911, p. 47). In the Chisos Mountains Mr. Bailey and Mr. Fuertes found the rare birds very tame, often lighting on a bush close by them or buzzing within a few feet of their faces. In a wooded gulch watered by a mountain brook where the Couch Jays, Stephens Whip-poor-wills, Band-tailed Pigeons, and numbers of noisy sociable Mearns Woodpeckers were found, Mr. Fuertes says, "occasionally a big Blue-throated Hummer would come skittling up the gulch, for all the world like a little swift, uttering his sharp little squeak every two seconds. Perhaps he would alight on the dead lower twigs of a drooping pine branch, and jumble his squeaks together into a kind of little song; more likely he would zip by like a bullet and disappear up the



FIG. 65. Blue-throated Hummingbird

gulch" (1903, p. 115). Up at the head of the gulch, Mr. Bailey often saw three or four at a time, bathing by flying through the spray of a waterfall.

The Mexican form of the Blue-throat was found by Doctor Nelson in south-central Mexico between 7,500 and 12,000 feet. They are rather quiet birds, he says, "often found perched on the tips of large maguey leaves." A nest that he describes was found at an altitude of 11,500 feet on the north slope of the volcano of Toluca, in the State of Mexico (MS).

ADDITIONAL LITERATURE.—RAY, R. C., Condor, XXVII, 49-51, 1925.

TROGONS: Order Trogoniformes

TROGONS: Family Trogonidae

In the Trogons, the bill is short and stout, with edges serrate and gape bristled; the eyelids are lashed, the wings short, tail long, feet small and weak, and the plumage soft and lax, of gorgeous coloration.

[COPPERY-TAILED TROGON: *Trogonurus ambiguus* (Gould)]

DESCRIPTION.—*Length*: About 11.2-12 inches, wing 5.1-5.5, tail 6.5-7.2. *Adult male*: Upperparts bright metallic green or bronze, middle tail feathers green to copper-bronze, broadly tipped with black or bluish black, outer pairs of feathers largely white, subterminally vermiculated; wing coverts vermiculated with black and white, primaries slate-black, outer webs grayish; face and throat black, chest like back bordered by white crescent; rest of underparts geranium red, thighs blackish, feathers partly pink; iris dark brown, naked eyelids red or orange, bill yellow, feet brownish. *Adult female*: Similar to male in color pattern but largely gray where he is black, and brown where he is green, red of underparts lighter, pink of thighs replaced by whitish; ear coverts crossed by a broad brownish bar; eye encircled by a broad brownish ring, iris and feet as in male, bill duller yellow. *Young*: Varying from gray head and underparts and brown upperparts—tail like female and wings spotted with buffy and black, white eye-ring and bar on ear-coverts—through a long series of changes to the full adult plumages.

RANGE.—Valley of the lower Rio Grande in Texas, and southern Arizona south to Oaxaca and Guerrero, Mexico; rare in the United States.

STATE RECORDS.—This Trogon has not yet been taken in New Mexico, but a breeding specimen was secured June 23, 1892, on the east side of the San Luis Mountains only five miles south of the New Mexico boundary and hence the species probably occurs in New Mexico.—W. W. COOKE.

NEST.—Reported in cavities in large trees, generally in large deserted woodpecker holes, but also in holes in banks. *Eggs*: 3 or 4, dull white (Forrer).

GENERAL HABITS.—This beautiful southerner should be carefully watched for in pine woods along the southern boundary of the State. Its note is said to suggest that of a hen turkey.]

KINGFISHERS, ETC.: Order Coraciiformes

KINGFISHERS: Family Alcedinidae

Subfamily Cerylinae

The Kingfishers have long, strong bills grooved on the inside so that the sharp cutting edges have a firm grip on their prey; the tongue is rudimentary or very small, as the food is swallowed whole, the indigestible parts being ejected later, and the throat is lined with downward propelling papillae. The legs are short and the feet small, with the third and fourth toes coherent and the fourth toe rudimentary, being used only in perching, in shoving the earth out of the



FIG. 66. Foot of Kingfisher



From Handbook of Birds of the Western United States

FIG. 67. The Mirrored Kingfisher

burrows, and in sliding along the burrows. The plumage is compact and oily to resist water, into which they plunge after fish.

BELTED KINGFISHER: *Megaceryle alcyon alcyon* (Linnaeus)

DESCRIPTION.—*Length:* 11–14.5 inches, wing 6–6.5, tail 3.8–4.3, bill 2 or more. *Adult male:* Heavy crest, upperparts, chest band, and sides, bluish gray, with fine black shaft lines; tail with middle feathers gray like back, the rest black or slaty, with gray edgings and transverse white markings; wings, with primaries and their coverts, slate-black, the quills spotted or tipped with white; spots under and before eye, cervical collar, and underparts (except belt) white; iris dark brown, bill black (sometimes paler basally), legs and feet livid slate. *Adult female:* Similar to adult male but with a broad belt across lower breast, together with sides, flanks, and axillars, cinnamon-rufous. *Young male:* Similar to adult male but chest band more or less tinged with brown. *Young female:* Like adult female but upper band largely rufous instead of mostly bluish gray.

RANGE.—Breeds from northwestern Mackenzie, central Keewatin, northern Quebec, and Newfoundland south to southern border of United States; winters from British Columbia, Nebraska, Ohio, and Virginia south to West Indies, Colombia, and Guiana, irregularly north to Ontario.

STATE RECORDS.—Lack of suitable conditions make the Belted Kingfisher a rather rare bird in New Mexico during the summer; indeed there seems to be no record of the actual finding of the nest in the State. Most of the streams in the lower altitudes are too irregular in volume to furnish a sure food supply, so that it is

confined largely to the middle reaches of the mountain streams where it subsists on small fish. It, however, does occur in summer and probably breeds [at Santa Fe in the banks of the Rio Grande (Jensen, 1923)], and at Carlsbad, where the Pecos swarms with small fish able to withstand the alkali (Bailey). It breeds along the mountain streams above Las Vegas (Mitchell), on the eastern slope of the Mogollons near Chloride (Blinn), and probably near Fort Webster and along the Gila (Henry). It was seen on the Pecos River, July 11-16, 1903, at about 8,000 feet, and probably had nested not far distant (Bailey).

In the fall migration it has been noted as high as 9,400 feet on the Costilla River, August 21, 1904 (Bailey); and also in the San Mateo Mountains (Goldman); Jemez Mountains (Bailey); White Mountains (Hollister); and in the Mogollons at Beaver Lake, where the first were seen August 26, 1908 (Birdseye). From the paucity of records it is evident that the species is rare in northwestern New Mexico.

One was seen at Aztec December 7, 1893 (Loring); one at Las Vegas December 20, 1882 (Batchelder); seen at two localities in Union County, at Clapham, where it was "not uncommon" October 26, 1893 (Seton); and one on the Cimarron River November 5, 1915 (Ligon). It was noted on the Carlsbad Bird Reserve, in January, 1915; in the winter of 1915-16; [and one or two seen in December, 1916; also on the Rio Grande Bird Reserve (Elephant Butte), where it was common November 23-December 9, 1916 (Willett). In the spring migration it is "well distributed over the State" (1916-1918). One was seen May 9, 1920, at San Simon (Ligon)].—W. W. COOKE.

NEST.—A dome-shaped chamber at the end of a burrow 4 to 15 feet long, in a cut-bank. *Eggs*: Usually 6 to 8, white; laid on bones and fish scales, crawfish shells, and other ejected hard parts of the food.

FOOD.—"Chiefly fish, in most localities species of no commercial value" (Henderson), but also aquatic insects injurious to fish; grasshoppers, crickets, beetles, crawfish, toads, frogs, lizards, small snakes, and sometimes mice.

GENERAL HABITS.—Along mountain streams the loud rattle of the Belted Kingfisher, which has been spoken of as the "territory note" by which he states his claim to rival fishermen, sometimes announces the rapid disappearance of a large grayish blue bird, on his solitary way to or from his woodland fishing grounds. When he lights on a branch over the water, his large, crested head and short legs and tail give him a top-heavy, abbreviated appearance; but when he plunges obliquely down into the water after his fish, the advantages of a trim compact form are easily seen—tail streamers would be decidedly in the way here.

They would be still more in the way in promenading back and forth through the long nest tunnel, especially as these curious cave dwellers, shown by Mr. F. H. Herrick's most interesting and enlightening photographs, have the anomalous habit of walking backwards. The formation of this grotesque habit in the young is clearly explained by Mr. Herrick. As he says, "From the time of birth the young lie huddled in a cluster in their dark underground chamber. . . As they grow in size and strength the monotony of sitting still, often with legs and wings interlocked, must become very great, and . . . they soon begin to bite and tease one another like young puppies. Should one be hard-pressed, the only way of escape lies along the narrow passage, which

they naturally traverse head first; but the instinct to return to the warm family cluster is strong, and to do this they are obliged to walk backwards. Again when the rattle of the *alma mater* announcing the capture of another fish is heard, each struggles to get down the narrow passage-way first, but when the parent enters the hole she hustles them all back."

Walking in these cramped quarters with the ordinary land bird foot, with spreading toes and curved claws might be decidedly awkward, and, accordingly, we find an almost abortive foot with one toe rudimentary and two coherent (non-spreading). Furthermore, as Mr. Herrick's photographs demonstrate, these strange birds walk "on the whole tarsus, which corresponds to the scaly part of the leg of a fowl, so that the 'drum-stick' rises from the heel" (1901, p. 89), giving a long narrow *ski*, most perfectly adapted to skiing either forward or backward in narrow tunnels, and which, when the burrow is being excavated, shoves out the earth chiseled loose by the great bill. The two tracks, which Mr. W. L. Finley speaks of, running from the door to the nest chamber, "worn by the feet of the birds" (1907a, p. 145), and Mr. Herrick's picture showing a stream of sand falling from the nest hole as one bird backs out (1901, p. 87), tell the story graphically.

Although it has been said that the male does not incubate, Mr. Joseph Mailliard has found one incubating (1921, pp. 194-195). As the Kingfisher's nests are often raided by snakes, sometimes large black snakes, it may be safer for the male to take the food to his mate on the nest; as when both parents are momentarily away the arch enemy sometimes slips in and destroys the eggs. In a nest that Mr. Herrick watched, before the young left, the nest chamber had been "gradually opened up in front and filled at the rear until it had advanced a foot and a half toward the mouth of the tunnel" (1901, p. 92).

It is hard to think of a Kingfisher out of sight of water, but Dr. W. H. Osgood once found one in Arizona miles from water and was much amused watching it "hopping about on the ground catching insects" (1903, p. 130).

At the strongly alkaline Burford Lakes, on the morning of October 2, 1904, we were surprised to see one of the big crested birds perched on a dead tree on the edge of the water. Apparently he had just arrived. Before night he was in a tree over the muddy fresh water rain pools by camp; and the next morning he was gone, doubtless in search of clearer and sweeter as well as more fruitful waters.

In the fall and winter of 1912-13, Mr. Ligon saw one on the Alamosa River in Socorro County. As he says, "although the water was generally frozen along the edges, morning and night, and at times almost all over, I saw the bird dive under and come up with its fish. In January and February I noted it constantly on the east Gila, but as nesting

time drew near it disappeared, and I think it moved down the river" (MS). The diving habit of the Kingfisher saves the day when he is pursued by a swift-flying hawk (Johnson, 1925, pp. 585-586). One that was watched by Mr. M. P. Skinner escaped a Sharp-shinned Hawk by awkwardly *swimming on the surface of the water* and diving when the Hawk swooped (1928, p. 100).

ADDITIONAL LITERATURE.—BAILY, W. L., Bird-Lore, II, 76-80, 1900.—BENDIRE, CHARLES, Life Histories of N. Amer. Birds, II, 34-39, 1895.—DUTCHER, WILLIAM, Educational Leaflet 19, Nat. Assoc. Audubon Soc.—FRANKLIN, DWIGHT, Bird-Lore, XII, 233-236, 1910.—GRATWICK, W. H., Bird-Lore, XXVIII, pp. 95-101, 1926.—LINCOLN, F. C., Wilson Bulletin, XXXVI, 113-115, 1924 (territory note).

[TEXAS KINGFISHER: *Chloroceryle americana septentrionalis* (Sharpe)]

DESCRIPTION.—Length: 6.7-8.5 inches, wing 3.4-3.5, tail 2.7, bill 1.6-1.8. Head without crest. Adult male: Upperparts dark metallic bottle-green, interrupted by white collar; tail and wings barred and spotted with white; throat and belly white, chest with brown band, sides and flanks spotted with greenish black. Adult female: Similar but without brown, white or buffy underparts crossed by two bands (the lower less distinct) spotted with green.

RANGE.—Southern Texas and Sinaloa, Mexico, south to Panama.

STATE RECORDS.—One specimen of the Texas Kingfisher was taken by Mearns, September 8, 1893, at Cajon Bonito Creek, Sonora, only six miles from the New Mexico boundary. The species was also taken by F. C. Willard, February 13, 1910, on the San Pedro River near Fairbanks, Arizona, only a few miles west of New Mexico. It is therefore probable that it will eventually be added to the New Mexico fauna.—W. W. COOKE.

GENERAL HABITS.—"Its sharp squeak, as it buzzes up stream away from the observer, is the best clue to its presence" (Griscom and Crosby, 1926, p. 19).]

WOODPECKERS, etc.: Order Piciformes

WOODPECKERS: Family Picidae

Subfamily Picinae

The Woodpeckers with few exceptions have strong, chisel-shaped bills for excavating and highly developed nasal bristles for protecting the air passages; long extensible tongues barbed at the tip for spearing



FIG. 68. Tongue of Woodpecker

woodborers; strong, stiff, and pointed tail feathers for propping up the vertical body on the side of a tree trunk; and feet, armed with long, curved claws with two toes pointing forward, one or two backward, apparently for giving more strength and flexibility of motion on the sides of tree trunks. They are hardy birds, some of which winter far north. Many have long been known to be migratory and returns from banded birds show that others, supposed to be resident, are also migratory (Lincoln, 1927b, p. 39). They feed largely on woodborers, and excavate their nests in tree trunks. Their voices are loud and

sharp, and in the breeding season, as they are unable to sing, they beat a far-reaching tattoo.

REFERENCES.—BEAL, F. E. L., Biol. Surv., U. S. Dept. Agr., Bull. 37, 1911.—BEAL, F. E. L., and F. A. LUCAS, Biol. Surv., U. S. Dept. Agr., Bull. 77, 1895 (food and tongues).—ECKSTORM, F. H., The Woodpeckers, 1901.—GARDNER, LEON L., Proc. U. S. Nat. Mus., 2591, vol. 67, art. 19, pp. 1, 3, 6, 9, 22-23; pls. 3, 10, 1925 (tongues).—LUCAS, F. A., Bird-Lore, II, 5-9, 1900 (tongues); Rep. U. S. Nat. Mus. for 1895, 1001-1019.—MCATEE, W. L., Biol. Surv. U. S. Dept. Agr., Bull. 39, 1911.—THAYER, G. H., Concealing-Coloration in the Animal Kingdom, 49-50, 114, 1909.

RED-SHAFTED FLICKER: *Coláptes cáfer colláris* Vigors

PLATES 37 AND 38

DESCRIPTION.—*Length*: 12.7-14 inches, wing 6.4-7.1, tail 4.4-5.2, bill 1.3-1.5. *Adult male*: Head and body mainly brownish with back and wings barred, and underparts below red "mustache" and black chest crescent, spotted with black; tail mainly black; shafts and underside of tail and wings red; iris reddish brown to brownish red, bill blackish, legs and feet bluish gray. *Adult female*: Similar to adult male, but red mustache only faintly suggested by a brownish stripe. *Young male in juvenal plumage*: Similar to adult male but coloration duller and black chest patch smaller, spots on underparts less sharply defined, and feathers of head tipped with paler. *Young female in juvenal plumage*: Similar to young male but red mustache replaced by a brown stripe.

RANGE.—Western North America (except middle Pacific coast region). Breeds from southeastern British Columbia (where a few probably winter, Brooks and Swarth), central Alberta, southern Saskatchewan, and North Dakota south to Tamaulipas, Nuevo Leon, Zacatecas, Durango, and northern California; winters over most of its United States and Mexican range.

STATE RECORDS.—The Red-shafted Flicker is in summer the most numerous woodpecker of New Mexico. [Well distributed, but not common in the Sangre de Cristo region, breeding at high altitudes (Ligon, 1919).] One was seen August 11, at timberline, 12,300 feet on the south side of Truchas Peak, and they were found breeding up to 11,600 feet at the foot of Pecos Baldy, where a pair were feeding young nearly ready to fly August 16, 1903, and a single old bird was seen feeding young out of the nest at 11,000 feet August 6, 1903. The next summer in the Taos Mountains they were seen from 7,400 feet in Pueblo Canyon to 11,400 feet in Wheeler's Peak amphitheater (Bailey); and the following year were found breeding at 7,000 feet near Fort Wingate (Hollister). [In 1923, in northern Santa Fe County they were very common, breeding from 5,500 to 12,500 feet (Jensen). At Lake Burford, 7,700 feet, they were fairly common and breeding May to June, 1918 (Wetmore).] These altitudes—5,500-12,500 feet—represent approximately the upper and lower limits of the breeding range of the species in northern New Mexico. In the southern part of the State, fresh eggs were found May 17, 1913, near Chloride, 6,200 feet, and young just hatched June 3, 1913, in Monument Pass, 8,000 feet (Ligon); [on and about the Animas Mountains they were abundant May 7 and 8, 1920. Young were seen in the nest June 28, 1920, in Black Canyon, 28 miles southwest of Chloride, at 8,000 feet (Ligon)]; and they breed as low as 6,000 feet at Silver City (Marsh); at Rincon, 4,000 feet (Ligon); and in the low hot valley at Mesilla, 3,800 feet (Merrill). They breed east to Sierra Grande (Howell), Halls Peak (Barber), Mesa Yegua (Bailey), Capitan Mountains (Gaut), and Guadalupe Mountains (Bailey).

The species was very common in the foothills and along the Red River in Colfax County, July 28-October 24, 1913 (Kalmbach). In the fall it spreads eastward

at least to Fort Sumner (Gaut) and to Roswell (Hollister), descending thus below 4,000 feet, and it is found equally low in the valleys of the Rio Grande and the Gila. [Noted September 30, near Gallup, and October 1 and 2, 1916, at White-water Creek (Skinner).]

It is not rare in winter in the State; Guadalupe Mountains south of Queen, abundant December 31, 1915 (Ligon); noted at Albuquerque, December 25, 1902 (Harman); and even to the northern part, as at Shiprock (Gilman); Espanola (Loring); Las Vegas (Batchelder); Union County, November 5, 1915 (Ligon); near Clapham, a pair was seen December 7; and at Perico, December 18, 1893, another pair was noted (Seton). In the region of the Carlsbad Bird Reserve it was common from the lower country to the summits of the Guadalupe Mountains January, 1915, and noted in the winter of 1915-16. [It was fairly common in December, 1916. On the Rio Grande Bird Reserve (Elephant Butte), it was common November 23-December 9, 1916 (Willett).]—W. W. COOKE.

NEST.—From 2 to 70 feet from the ground in rotten stubs or trees; also in holes in banks, in sides of houses, and gate and fence posts. *Eggs*: 5 to 10, white.

FOOD.—In 183 stomachs examined the food consisted of 67.74 per cent of animal matter and 32.26 of vegetable. Ants aggregate 53.82 per cent of the total food. Larvae of the codling moth, the greatest apple pest (McAtee, 1912, p. 564), bugs, spiders, white ants, caterpillars; and from October to February, crickets, grasshoppers, locusts, and an occasional alfalfa weevil make up the rest of the animal food. Of the vegetable matter 10.28 per cent was fruit taken mainly in late fall or winter; grain amounted to 2.26 per cent, and was partly waste grain in winter. Seeds amounted to 19.59 per cent, largely seeds of poison oaks. "The farmer and horticulturist have little to fear from the Red-shafted Flicker. In its animal diet it does very little harm, and it consumes no more of the products of husbandry than it is entitled to. Its greatest fault is distributing seeds of the poisonous *Rhuses*" (Beal, 1911, p. 62). "In destroying ants it is working for the best interests of man, as many large harvest ants . . . do considerable damage to grain and forage, not only by cutting down the crop for a space of several feet about their domicile, but by building nests which menace the operation of the mower or reaper" (Kalmbach, 1914, p. 9).

GENERAL HABITS.—Hybrids of the eastern or Yellow-shafted Flicker and the western Red-shafted have been well known from the intersection of their ranges at the western border of the plains and northwestward through British Columbia, but apparently had never been recorded from New Mexico until a male was taken, on March 6, 1928, by Maj. Allan Brooks and Mr. Kellogg, three miles north of Silver City, some distance from its normal western limit in central Texas. As Mr. Kellogg writes, "It was in company with several typical Red-shafted birds. It had the red nuchal crescent, yellow wings and tail, and red moustaches underlaid with black" (MS).

In the flickers, as in the sapsuckers, we find a marked departure from the strict woodpecker type, showing adaptation of form and coloration to habit. The bill, instead of being chisel-shaped and bevelled, is slender and comparatively weak. In the flickers, the tongue instead of being a heavily barbed spear for extracting woodborers is a probe so long that it can probe deep into ant hills, while the large salivary glands supply



Photograph by Robert B. Rockwell

YOUNG RED-SHAFTED FLICKERS

Part of the family show the characteristic white rump patch; the two on the right the black necklace; and the one on top of the stump, the red mustache

a mucilaginous secretion which glues the ants to the tongue. As ants make up over half the food of the flickers and are found largely in the open, the plumage of the birds instead of being black like that of the forest woodpeckers, has the brown tones of ground birds of the open. Again, while their ground colors make them inconspicuous when at rest, their large white rump patches serve as an admirable directive mark in flight.

A touch of great beauty is given the Red-shafted Flicker in the exquisite salmon that flashes from the underside of its wings and tail as it flies overhead, a beauty quick to be appreciated by some of the California Indians, whose spectacular flicker head-dresses are among their most cherished possessions.

As the Flicker is a widely distributed, familiar bird, its varied calls and tattoos, its ardent courtship, its methods of nest excavation, and feeding and care of the young can be studied with satisfaction at first hand.

The family of nearly grown vociferous young Red-shafts, which we found in their nest at the foot of Pecos Baldy, as well as the parent that came to the outside of their knot hole and fed them nature's prepared food by regurgitation, showed none of the cautious silence of birds bred in the presence of man. Both the soft *wick-up, wick-up, wick-up* of the parent and his resounding *if-if-if-if-if-if-if-if-if* were given with delightful freedom in the close neighborhood of the nest.

The Mockingbird, Professor Merrill says, "tries hard to imitate the Flicker's call but he fails to get into the 'scape' the genuine stirring qualities of the original" (MS).

The Flickers are hardy birds. On the first of February, 1922, when the temperature was only two degrees above zero, one was seen by Mr. Jensen hanging to a wire screen on a sleeping porch at the Santa Fe Indian School, eating the berries of the Boston ivy (1923b, p. 458).

Although they are so hardy and apparently able to enjoy real winter temperatures, the question of the comparative hardihood of individuals may be raised. Among the eastern, Yellow-shafted Flickers banded under the direction of the Biological Survey, the returns give some interesting winter records; as birds from Indiana being taken in Mississippi; from Pennsylvania, in Georgia; and actually one from Saskatchewan being found in Texas, in late October (Lincoln, 1927b, p. 39).

At Mesilla Park, Professor Merrill reported, "the Flicker comes from the south the latter part of February and stays till late the following December. An occasional one may be seen among the big trees in the valley all winter. In summer it is plentiful in the valley, nesting in cottonwoods and willows. Ants form the bulk of the summer food. The gizzard of one examined was literally stuffed with agricultural ants and remains of a few grubs of some kind" (MS).

At the Carlsbad cave late in March and early in April, Mr. Bailey found two "apparently spending the nights in small holes in the limestone wall, high up under the arched doorway." He says that "on several occasions they were seen trying to drive away the pair of Sparrow Hawks that also had staked out claims in the doorway, and once they were seen attacking a Rough-legged Hawk that had taken refuge there" (1928a, p. 148).

The leisurely undulating flight of the Flicker does not suggest speed, but Claude Gignoux reports that one hard pressed bird whose flight was measured by the speedometer of an automobile gave a record of twenty-seven miles an hour (1921, pp. 33-34).

ADDITIONAL LITERATURE.—ALLEN, J. A., Bull. Amer. Mus. Nat. Hist., vol. 4, pp. 21-44, 1892 (hybrids).—CHAPMAN, F. M., Bird-Lore, XXIX, 115, colored frontispiece, 1927.—HAWKINS, C. J., Auk. XXXV, 428-429, 1918.—IRVING, F. N., Condor, XXII, 10-16, 1920 (importance of blind in photography).—MILLER, O. T., Little Brothers of the Air, 34-47, 1892 (Golden-shafted Flicker); Upon the Tree-Tops, 164-165, 1897.—O'KANE, W. C., Bird-Lore, XXVIII, pp. 247-249, 1926.—SHERMAN, A. R., Wilson Bull., XXII, 133-171, 1910 (life history).

NORTHERN PILEATED WOODPECKER: *Ceophloeus pileatus abieticola* Bangs

DESCRIPTION.—*Male*: Length 16-18 inches, wing 9.4-10, tail 6-6.8, bill 2.2-2.3, tarsus 1.3-1.4. *Female*: Length 17 inches, wing 9.1-9.6, tail 6.1-6.3, bill 2-2.1, tarsus 1.3-1.4. *Head crested. Top of head, occipital crest, and malar stripe bright red; body slaty black, with white or primrose yellow patch on wings and under wing coverts; chin and stripe on side of head and neck white or primrose yellow. Adult female*: Similar to male, but forepart of head and malar stripe brown instead of red. *Young male*: Similar to adult male but red duller and, anteriorly, less uniform; body lighter, more sooty. *Young female*: Similar to young male but forehead and most of crown brown, crown spotted.

RANGE.—Canadian and Transition Zone forests from southern Mackenzie, northern Manitoba, northern Ontario, southern Quebec, and Newfoundland south to southern Alleghenies, northern Indiana, western South Dakota, Montana, and Alberta. Recorded from southern New Mexico. Extent of southward migration supposed to be slight.

STATE RECORDS.—More than half a century ago Doctor Henry sent to the Smithsonian Institution a specimen of the Pileated Woodpecker which was labelled as having been taken on the Rio Grande in New Mexico. There was probably some inaccuracy in labeling, but the specimen might perhaps have come from the mountains at the head of the Mimbres only a day's ride from Fort Thorn on the Rio Grande, where Henry was stationed. In any case, the record comes from a district far removed from the usual range of this species. The only possible corroboration of the record that we have comes from Bailey who, in October, 1906, saw a number of woodpecker holes from 8,500 to 9,600 feet in the Mogollon Mountains in the same mountain group, apparently made by a Pileated Woodpecker; but no bird was seen, nor is there any sure record of the species within 300 miles of New Mexico in any direction.

NEST.—In remote, heavy timber, generally at great heights. *Eggs*: Usually 3 to 5, white.

GENERAL HABITS.—As the Northern Pileated Woodpecker is apparently absent or nearly so from the Rocky Mountain sections of Arizona, New Mexico, Colorado, and Wyoming, Doctor Henry's record for New Mexico is of peculiar interest and the appearance of this notable bird should be kept clearly in mind that no possible straggler be overlooked. Far and away larger than any other woodpecker of the region, with a wing extent of twenty-five to thirty inches, the great black bird with his red crest and white wing spots may be named on sight as he goes bounding away through the forest. His signaling tattoo can be heard far through the forest, and the blazes or borings he leaves on the dead trees may usually be recognized in passing. Excavated oval troughs with a round thumb hole in the bottom tell the story. Sometimes slabs of decayed wood several feet long will be torn from a stub and thrown on the ground.

As the male and female of the Northern Pileated are commonly seen together in winter as well as in summer, it is supposed that they are mated for life.

ADDITIONAL LITERATURE.—CARRIGER, H. W., and GURNIE WELLS, Condor, XXI, 153-156, 1919 (nesting).—MILLER, L. H., Condor, XXI, 77-80, 1919.

GILA WOODPECKER: *Centurus uropygialis uropygialis* Baird

PLATE 38

DESCRIPTION.—*Length:* 8-9.3 inches, wing 5-5.3, tail 3.5-3.9, bill .9-1.2. *Adult male:* Head, neck, and underparts drab, except for red crown patch and pale yellow belly; back, rump, and wing coverts barred with black and white, primaries black marked with white; tail black, middle and outer feathers marked with white; iris orange, bill blackish, legs and feet greenish. *Adult female:* Crown without red, belly paler, yellow more restricted. *Young male:* Similar to adult male but head and underparts grayer, crown patch smaller and duller, and back more or less washed with brownish, barring less distinct. *Young female:* Like young male but crown without red.

RANGE.—Lower Sonoran Zone from northwestern Lower California, southeastern California, southeastern Nevada, central Arizona, and southwestern New Mexico south through western Mexico to Jalisco.

STATE RECORDS.—The common name of the Gila Woodpecker was bestowed on account of its abundance in the valley of that river up which it ranges from Arizona into New Mexico as far as the town of Gila, where it was noted October 6-12, 1908. It had been found common the last week in September, 1908, farther down the river at Redrock (Goldman). There is no certainty as to whether or not the birds had nested at the above localities. These are the first records for the species in New Mexico, though it has been credited to the State for the past 50 years on the strength of specimens that were really taken in Arizona. [It was observed only in the extreme southwestern part of the State, among the Arizona sycamores, where, April 8, 1916, birds were preparing nesting holes (Ligon). A specimen was taken 20 miles west of Silver City, December 10, 1917, and the species was found common and nesting May 13, 1924, at Redrock, 30 miles west of Silver City (Kellogg).]—W. W. COOKE.

NEST.—In giant cactus, cottonwoods, willows, sycamores, oaks, and mesquites. *Eggs:* 3 to 5, white.

Food.—Insects of various kinds, as ants, beetles, grasshoppers, and larvae, and also mistletoe berries and the fruit of the giant cactus.

GENERAL HABITS.—In southern Arizona at least, Major Bendire says, the drab-headed Gila Woodpecker seems "equally partial to the well-timbered bottom lands and mountain canyons as well as to the



MAP 15. GILA WOODPECKER

Shaded areas show general range. Triangles mark breeding and other records

giant cactus groves in the more arid foothill regions" (1895, p. 128). When building in the giant cactus, Doctor Heermann notes, "the pith of the plant is extracted until a chamber of suitable size is obtained, when the juice exuding from the wounded surface hardens and forms a smooth dry coating to the cavity, thus making a convenient place for the purposes of incubation" (1859, p. 17).



LEWIS WOODPECKER WESTERN RED-HEADED WOODPECKER
 ROCKY MOUNTAIN SAPSUCKER MOUNTAIN HAIRY WOODPECKER
 MALE FEMALE ARIZONA WOODPECKER RED-SHAFTED FLICKER

FOOD.—Insects of various kinds, as ants, beetles, grasshoppers, and larvae, and also mistletoe berries and the fruit of the giant cactus.

GENERAL HABITS.—In southern Arizona at least, Major Bendire says, the drab-headed Gila Woodpecker seems "equally partial to the well-timbered bottom lands and mountain canyons as well as to the



MAP 15. GILA WOODPECKER

Shaded areas show general range. Triangles mark breeding and other records

giant cactus groves in the more arid foothill regions" (1895, p. 128). When building in the giant cactus, Doctor Heermann notes, "the pith of the plant is extracted until a chamber of suitable size is obtained, when the juice exuding from the wounded surface hardens and forms a smooth dry coating to the cavity, thus making a convenient place for the purposes of incubation" (1859, p. 17).



LEWIS WOODPECKER
 ROCKY MOUNTAIN SAPSUCKER
 MALE FEMALE

GILA WOODPECKER

ARIZONA WOODPECKER

WESTERN RED-HEADED WOODPECKER

ROCKY MOUNTAIN HAIRY WOODPECKER

RED-SHAFTED FLICKER

While seen by us flying out of holes in the giant cactus above Tucson, it also nested in the live oaks of a ranch house at the foot of the Santa Ritas, and was noisy around our adjoining camp "in the sycamores, mesquites, and hackberries, frequently visiting the beef bones and bacon rind put out for its benefit and getting water from a dripping ranch faucet" (1923b, p. 23).

In Indian villages on the Gila, French Gilman found the Gila Woodpecker almost domesticated. As he explains, "The Indians store corn in the ear on the flat tops of their houses and sheds, and each home has one or more Woodpecker retainers hanging about most of the time." By putting out feeding tables, Mr. Gilman was able to get good photographs and to study the animated birds at close range. He says that they would come regularly for food and did not hesitate to call loudly for breakfast if it was much delayed.

In his interesting paper, he asks pertinently, "Were it not for the Gila Woodpecker, what would become of the several species of birds that use already prepared cavities for their domiciles?" "In some cases," he goes on, "these tenants do not even await the pleasure of the excavators, but take forcible possession." Among the nesting tenants he found the Elf Owl, Ferruginous Pygmy Owl, Ash-throated Flycatcher, and Arizona Crested Flycatcher. Occasionally, he adds, "a Cactus Wren makes use of the handy hollow. . . . A big 'roughneck' scaly lizard frequents the holes when not too high in the cactus, and in two holes in willow trees I found snakes." The lizards and snakes surprised in their borrowed dens quite naturally crawl up your arm to escape, and rats and mice taking refuge in the deserted holes also quite naturally pop out into your face; but however unpleasant such surprises may be, the original excavators must be acknowledged as unwitting benefactors of their many neighbors (1915b, pp. 152-153).

RED-HEADED WOODPECKER: *Melanerpes erythrocephalus* (Linnaeus)

PLATE 38

DESCRIPTION.—*Male:* Wing 5-5.9 inches, tail 2.8-3.2, bill 1-1.1, tarsus .8-1. *Female:* Wing 5-5.7 inches, tail 2.6-3.3, bill 1.1-1.2, tarsus .8-.9. *Adults:* Entire head and neck solid crimson; back, wings, and tail mainly black (the back glossy blue-black or greenish black); wing patch (secondaries), base of tail (rump and upper tail coverts) and underparts white; belly more or less tinged with yellowish or reddish; iris brown or reddish brown, bill bluish gray, bluish white basally, legs greenish gray. *Young in juvenal plumage:* Similar to adults, but feathers of head and nape blackish basally with grayish brown borders, throat and breast grayish, streaked with black, occasionally with a few red feathers; back and wing coverts black, edged with brown.

RANGE.—Transition and Austral Zones from British Columbia, Alberta, southern Saskatchewan, Manitoba, and Ontario south to Florida, the Gulf of Mexico, and New Mexico; recorded from Utah and Arizona.

STATE RECORDS.—The Red-headed Woodpecker apparently came into New Mexico with the scattered cottonwoods along the main river valleys, principally the Pecos and Rio Grande, but also along the Red River in Colfax County, where it was frequently seen July 28–October 24, 1913 (Kalmbach). On the Rio Grande in 1858, it was reported 100 miles north of Fort Thorn, which would be in the vicinity of Socorro (Henry). On June 22, 1864, it was reported at Los Pinos near Albuquerque (Coues); and August 24–30, 1905, at Isleta (Hollister); adults were seen at Albuquerque, June 7–8, 1915 (Leopold); [five were seen along the railroad track between Isleta and La Jola, on the Rio Grande, August 28, 1917; it was reported at Los Lunas, September 4, 1917 (Ligon); and found 2 miles north of Belen on May 23, 1919, where they were seen entering a hole in a dead cottonwood, and apparently were breeding (Piper); one was seen 4 miles north of Albuquerque August 18, 1918; an adult 5 miles south of Albuquerque May 25, 1919; and in the same locality a nest was found containing young birds about 10 days old June 16, 1919 (Leopold). On July 16, 1919, Leopold reported, "Red-headed Woodpeckers are almost common here this summer. I see so many that I have given up keeping individual records. It looks as if they had become established."]

In the Pecos Valley a nest containing young was found near Fort Sumner on July 1, 1915; one of the birds was seen February 2, 1916, at Roswell (Leopold); [it was noted on South Spring River south of Roswell September 9, 1916; and one at White Tail on the east slope of the Sacramento Mountains at about 7,500 feet May 27, 1918 (Ligon).] In the northeastern corner of the State, one was seen about the middle of August, 1903, at Sierra Grande, and a few days later a young of the year was taken in Bear Canyon a little farther north (Howell).

[In 1919 and 1920 Jensen noted a pair nesting in Santa Fe; in 1921 a pair of Sparrow Hawks took the nest, but in 1922 the Red-heads were back again. Although, as Ligon writes, in 1919 we thought that the birds were getting fairly well established as far west as the Rio Grande south of Albuquerque, in 1924 and 1925 they seemed to have largely disappeared from the eastern part of the State. In the summer of 1924 and the spring of 1925 Ligon frequently visited the Rio Grande Valley and was several times in the Pecos Valley, besides making an automobile trip from Carlsbad to Clayton, traversing the length of the eastern side of the State. The only Red-headed Woodpecker seen during these 2 years was on May 16, 1925, on a fence post on the Staked Plains, about 4 miles northeast of Lovington, Lea County. In 1926, he found them rather common on the Dry Cimarron in the northern part of Union County. They were especially numerous, August 17 and 18, at the Fowler Ranch, 20 miles northeast of Folsom. In 1928, on June 10, he saw one about 10 miles north of Albuquerque, among the big cottonwoods near the Rio Grande, carrying food to its young. On July 10, he saw one a mile northeast of Folsom, on the Dry Cimarron. On July 12, he saw one on the Mora River about two miles southeast of Shoemaker, and was told that they were quite frequently seen there. From these and other observations he concludes that they are "fairly well distributed in eastern New Mexico but never numerous at any place" (MS).]—W. W. COOKE.

NEST.—Eight to eighty feet from the ground, in stubs, trunks, or branches, and on treeless prairies in fence posts and telegraph poles. *Eggs*: Usually 4 to 7, white.

FOOD.—Nearly twice as much vegetable as animal, mast—mainly acorns—and wild fruits being favorite natural foods. In certain localities cultivated fruits and crops are injured, and when nests are made in telegraph poles, more or less damage may result. While the Red-head eats some useful insects, the harmful ones that it destroys offset them. Besides destroying clover beetles, corn weevils, cherry scale, the seventeen-year locust, and codling moth larvae, in August it feeds

freely on grasshoppers, storing them up for later use. For the most part the charges made against this bird "represent the occasional acts of individuals, or are local and not characteristic of the species as a whole" (Henshaw, 1911 and 1914, p. 498).



MAP 16. RED-HEADED WOODPECKER
Triangles mark all known records to 1926

GENERAL HABITS.—This handsome tricolored Woodpecker with its solid crimson head and neck, its blue-black back, and the wide white band shown strikingly across wings and tail in flight can be recognized anywhere, and its distinctive *krit-lah-rah* becomes pleasantly familiar on its nesting grounds. Under the caption "Are the Red-Headed Woodpeckers moving west?" Aldo Leopold in 1918, after citing a number of instances of their occurrence in New Mexico, made an interesting suggestion, calling attention to the fact that "an examination of a map shows that most of the birds were seen on or near transcontinental railway lines, which strongly suggests that they crossed the plains by

traveling along the lines of telegraph poles which follow the railroads" (1918, p. 122). Other possibilities also enter in here. Not only would the cottonwoods along the river valleys have helped to carry the Woodpeckers across the plains, but as Doctor Oberholser has pointed out, since prairie fires have been stopped by the fencing of the land, besides the natural extension of the growth of mesquite, wooded areas have been increased by planting.

In any case the handsome Red-head, one of the most attractive birds of the north and east, but also unfortunately one of the easiest targets for the unthinking, had nearly crossed New Mexico, when it apparently disappeared. What relation, if any, this apparent disappearance bore to food habits, natural and acquired, is worth investigating. The diet of the Red-heads is so much more general, less animal and more vegetable, than that of the forest inhabiting woodpeckers, which live largely on woodborers, that "their tongues are much less extensible and the barbs near the tips are replaced by hair-like processes" (Henderson). In the East, in the beechwood part of New York, Doctor Merriam found that a good beechnut year meant a good Red-headed Woodpecker and gray squirrel year, the Red-heads wandering in search of food in the off years (1884, p. 226). Acorns and other mast and wild fruits are also favorite natural foods. The fruits and insects of the river valleys may well give them what they need in the breeding season, but after that would they not naturally wander up into the oak country and the pinyon belt for winter food, the oaks supplying acorns and the pinyon pines delicious little pinyon nuts quite comparable to the beechnut of the East? This is one of the many interesting questions for the field worker in New Mexico to investigate.

Should the Red-head again increase to the extent of raising a question of its economic status, Professor Beal's statement that any appreciable harm that it has done in the past "has probably been due to new and unusual conditions likely to be temporary" (1911, p. 42), should be borne in mind, and, when possible, measures taken to substitute wild fruits for cultivated, nesting boxes for telegraph poles, and perhaps to plant oaks where they will do well. But still more important—all those interested in the preservation of New Mexico's most attractive birds should work together intelligently for the Red-Head's protection.

ADDITIONAL LITERATURE.—HAY, O. P., Auk, IV, 193-196, 1887.—LEOPOLD, ALDO, Condor, XXI, 40, 173-174, 1919.—MILLER, O. T., Little Brothers of the Air, 211-220, 1892.

MEARNS WOODPECKER: *Balanõsphyra formicivora aculeata* (Mearns)

PLATE 39

DESCRIPTION.—*Male:* Length 7.7-9 inches, wing 5.3-5.8, tail 2.7-3.2, bill .9-1, tarsus .7-.8. *Female:* Length 7.5-8.6 inches, wing 5.2-5.7, tail 2.6-3.2, bill .8-1, tarsus .8-.9. *Adult male:* Feathers around base of bill black, bordered by white



Rain Agassiz Guertles.

From Biological Survey

ACORN-EATERS (*Balanosphyra formicivorus bairdi*) AT THEIR STOREHOUSE

In the New Mexico form, Mearns Woodpecker, the bill is not quite so heavy, and the black chest band is more streaked with white, but the squarish white or pale yellow patch adjoining the red crown and the glossy greenish upperparts are characteristic of both California and New Mexico birds

face band becoming pale yellowish on throat; crown red; sides of head, upperparts, and chest band glossy greenish blue-black, chest band extensively solid black, streaked below with white; rest of underparts white streaked with black except medianly; rump, upper tail coverts, and patch on wing quills white; tail black. *Adult female:* Similar, but with a black band separating white of forehead from red of crown; iris variable (pinkish white, bluish, brownish, or yellowish); bill black. *Young in juvenal plumage:* Head markings less defined, black duller, but color pattern that of the adult male.

RANGE.—Transition and Upper Sonoran Zones from northern Arizona, northern New Mexico, and western Texas south over northwestern Mexico.

STATE RECORDS.—The Mearns Woodpecker is the most abundant woodpecker in many parts of southern New Mexico, but it also occurs in other parts of the State in the oak belt where it finds acorns, its principal food. In the Capitan Mountains it was commonly breeding around the base of the mountains June 8–19, 1899, and in western New Mexico it was common at Largo Canyon as a breeder (Bailey). [August 6, 1916, old and young birds were observed on the head of the Gallina River, 18 miles north of Cuba at 7,500 feet (Ligon); June 28–July 3, 1919, a nest of full-fledged young was found in a Douglas fir at the south end of Moreno Valley, at 8,700 feet (Piper). Great numbers were seen May 8, 1920, in yellow pines from 7,000–7,500 feet at the north end of the Black Range, and it was found west of Chloride at 7,000 and 6,400 feet in May and June, 1920. It was observed as low as 6,000 feet on the east slope of the Black Range, also low down in the Animas Mountains (Ligon, 1916–1918); and recorded at Silver City, 5,800 feet, May 8, 1916 (Kellogg).]

Ligon considers it resident wherever found, but at times it wanders after the breeding season, perhaps like the Redhead, in poor acorn years. It has been recorded in the fall in the Chuska Mountains, October 11, 1908, at 8,500 feet (Birdseye), where the bark of the yellow pines was riddled with the holes made in former years for the storing of acorns. Several were seen the middle of August, 1905, in the lower pine belt of the San Mateo Mountains (Hollister); and others seen in September, 1909, on Mount Taylor (Goldman). One was seen at San Pedro the middle of July, 1889 (Bailey); at Albuquerque August 18, 1899 (Birtwell); and on the Pecos River at 7,800 feet near Willis, the species became common after August 27, 1883 (Henshaw); although it had not been seen previous to that date and evidently did not breed in the vicinity. It was found frequenting the oak groves, but there was no indication anywhere of acorn storing. Two were seen September 6, 1903, northeast of Mora, at 8,000 feet near the foot of Ocate Crater (Surber). Eastward the species extends to the Guadalupe Mountains, where it was abundant in early August, 1901 (Bailey). Throughout southern New Mexico it ranges down to about 5,000 feet or about to the lower limit of the oaks, and is found in the mountains as a breeder to about 7,500 feet.

In the Guadalupe Mountains west of the Carlsbad Bird Reserve it was common above 5,500 feet, in January, 1915 (Willett); and in the same region south of Queen it was abundant in the yellow pines December 31, 1915 (Ligon).

NEST.—Usually in white oaks, but also in pines. *Eggs:* 4 or 5, white.

FOOD.—Principally acorns, but also insects, including ants, bugs, flies, and grasshoppers.

GENERAL HABITS.—In coming down the heavily timbered mountains, cherishing the memory of one distant view of a Three-toed Woodpecker and perhaps catching a glimpse of a silent Hairy in passing, you

come down into the open pine and oak woods well prepared to enjoy the loud, jolly *ja-cob, ja-cob, ja-cob, ja-cob* that greets you from a sportive band of the white-faced Acorn Woodpeckers, as they are well called by Doctor Coues. The name fits well, for acorns make up more than half



MAP 17. MEARNS WOODPECKER
Shaded areas show breeding and general range

their total food for the year. As the acorns, if allowed to fall and lie on the ground, would be carried off by rodents and other hungry or provident neighbors, the birds have acquired the remarkable habit of storing them away, usually in the dead wood or bark of pines or other convenient trees. Circular holes are drilled close together in regular rows till a section of bark suggests a pepper box top, and into these holes the acorns are wedged so tightly that pilfering jays and squirrels can easily be

caught in the act and properly punished. As Mr. Ligon says, the great number of holes, or acorn stalls, in the dead yellow pines, in the range of the Mearns Woodpecker, is evidence of its industry.

A yellow pine snag, which he found at about 7,800 feet on the edge of a half pine-clad valley known as O-O Canyon, about a hundred miles southwest of Magdalena, was literally honey-combed with holes. As he describes it, "The snag was about thirty feet tall, and my estimate was that there was an average of a hundred holes to the square foot of surface. The average circumference of the stump was about three and a half feet, making 10,500 acorn storage holes. The holes were from half an inch to five eighths of an inch in diameter and about an inch deep in the bark and rotten outer surface of the wood. Many of the stalls contained dried acorns that were stored the year before, and although dry they were sound and good. Two large dead pines stood within twenty feet of the snag, and these were also thickly perforated, one half of the holes containing acorns. Two pairs of the birds were nesting in the nearby trees" (MS).

In the San Mateo Mountains, where Mr. Ligon found the Woodpeckers very abundant, they were living in the pines intermixed with oaks down to about 6,000 feet.

At the head of the Mimbres, Mr. Bailey found many of the old pine trees thickly perforated, some full of acorns, others empty (MS); and in the Chuska Mountains, Mr. Birdseye found trees the bark of which was riddled with holes common all through the yellow-pine parks, many of them with the bark stripped off by bears in attempts to get the acorns. There were no acorns in the Chuskas that year, although several of the Woodpeckers were seen (MS). In the Pecos Mountains, Mr. Henshaw found the birds wandering, perhaps in search of better acorn crops.

In the Yosemite Valley, where C. W. Michael watched the California form of the Mearns Woodpecker for a term of years, he found that during several years when there was a bountiful crop of acorns "the great granaries were utterly ignored and but desultory storing was practiced. . . . Then came the fall of 1923 with a complete failure of the acorn crop . . . and the California Woodpeckers, for lack of food, were forced during the winter of 1923-1924 to leave the valley." In the spring, the birds returned, and that fall, when the oaks again bore a heavy crop, Mr. Michael found "at least a few individuals, taking full advantage of the opportunity to store." As he concludes, "It is the barren years that teach the value of thrift. Intelligence plus experience may well have been the cause of the excessive storing of this year. A few of the more intelligent woodpeckers that were forced last winter to abandon the valley for lack of food are now preparing against the next lean year" (1926, pp. 68-69).

A provident storer in the Sequoia Park was more thrifty than wise, choosing the uncapped radiator of a government truck as a storehouse for his acorns! ¹

An odd habit of the Woodpeckers was happened on by Mr. Ligon in the Black Range. At dark, on March 15, 1913, seeing a bird enter a hole about eight feet up in an oak he closed it after it, and in the morning when he returned was surprised to find six birds in the one hole. As the Woodpeckers do not nest until the last of May, and then in high dead pines, it was, of course, a night roost (MS).

A remarkable case of "Communism in the California Woodpecker" has been described by Frank A. Leach in the Condor. Eight or ten birds, which "seemed to form a colony," not only worked together in excavating the nests but apparently in incubating the eggs and feeding the young (1925, pp. 12-19).

· ADDITIONAL LITERATURE.—HENSHAW, H. W., Condor, XXIII, 109-118, 1921.—PECK, M. E., Condor, XXIII, 131, 1921.—RITTER, W. E., Condor, XXIII, 3-14, 1921 (storage of acorns).

LEWIS WOODPECKER: *Asyndesmus lewisi* Riley

PLATE 38

DESCRIPTION.—*Length*: 10.5-11.5 inches, wing 6.5-6.8, tail 4.4-4.7. *Adults*: Upperparts glossy greenish black except for gray collar; *face dull crimson, chest gray, changing to soft rose on belly*. Feathers of collar and underparts bristly, "loosened and disconnected, being devoid of barbicels and hooklets" (Coues). Iris brown, bill black or dusky, legs and feet bluish gray. In female, gray of chest usually mixed with dusky. *Young*: Red of head (except in transition plumage) replaced by black or dusky, collar obsolete or wanting, underparts mostly grayish, feathers softer; wings sometimes slightly marked with white (on secondaries).

RANGE.—Breeds in Transition Zone from southern parts of British Columbia and Alberta to Black Hills, South Dakota, and western Kansas, south to New Mexico, Arizona, and California; in winter from British Columbia (occasionally south to Lower California, western Texas, and Chihuahua).

STATE RECORDS.—Nearly the whole of Colorado between 6,000 and 8,000 feet altitude is included in the breeding range of the Lewis Woodpecker, and this range extends south into suitably timbered parts of New Mexico. It was noted at Tres Piedras, about 8,000 feet, July 11-19, 1892 (Loring); [was seen feeding young, August 9, 1919, near Pojaque, in northern Santa Fe County, where they are fairly common in spring and summer and abundant in fall (Jensen)]; was found in the yellow pines of Mesa del Agua de la Yegua southeast of Las Vegas June 25, 1903, at 7,400 feet (Bailey); [noted at Cuba, Valencia County, and on the Mescalero Indian Reservation; on the east slope of the Sacramentos, 35 miles northeast of Cloudercroft, where a nest was found June 15, 1917, in a large yellow pine at 6,500 feet (Ligon).] Young in the nest were found July 13, 1913, near the mouth of the Chama River, 6,000 feet, and the species was common all the way up the Chama River to Horse Lake, where often a dozen were in sight at one time (Ligon). It may also breed near Oak Canyon, where it was numerous late in August, 1903; Long Canyon

¹ Stockton Record, February 14, 1925.

September 19-30, 1903 (Howell); near Black Lake, September 6-10, 1903; Solitario Peak, September 4, 1903; up to 8,500 feet on the Hondo River, September 25, 1903; and at Lake La Jara, September 17, 1904 (Bailey); also at Lake Burford September 28, 1904 (Gaut). [In 1926 it was rather common along the Mora River, at and near Watrous, August 10; seen commonly, August 17 and 18, on the Dry Cimarron from near Kenton, Oklahoma, to within a few miles of Folsom; more abundant than ever before noted in the State, September 18 and 19, south and southwest of Dulce, in Rio Arriba County (Ligon).]

In the fall, in central and southern New Mexico it occurs mainly as a migrant. [It was common near Albuquerque, September, 1918 (Leopold)]; seen near Zuni September 21-22, 1908 (Birdseye); [about 10 miles northwest of Gallup September 29, and several at White Water Creek, October 1 and 2, 1916 (Skinner)]; in Largo Canyon October 5 and Old Fort Tularosa October 10, 1906 (Bailey); head of the Gila River October 24, 1908 (Bergtold); common on the North Fork of Sapello



MAP 18. LEWIS WOODPECKER

Shaded areas show general range. Triangles mark breeding or near breeding season records

Creek, August 20, 1908 (Bailey); noted at Fort Webster and Fort Thorn (Henry); at Ruidoso, August 2, 1898 (Barber); and at Weed near the south end of the Sacramento Mountains, September 5, 1902 (Hollister). At Aragon in the Tularosa Range, the migration of the species, before rare or absent, was well under way September 15, 1915, and still on about the same, October 7 (Ligon). In November, 1874, it was common locally between Fort Tularosa and Fort Craig (Henshaw).

[In winter it is observed sparingly to the central part of the State (1916-1918).] Two were seen in the Guadalupe Mountains south of Queen, December 31, 1915 (Ligon). At Chama in the middle of December, 1893, several small parties were seen, all composed of adult males. These disappeared after a heavy snowstorm late in December (Loring). A flock wintered at Santa Fe in 1915 and 1916 (Leopold).

In the spring migration, [March, 1917, it was very abundant near Lamby]; it appeared May 2, 1913, near Fair View (Ligon); a specimen was taken May 4, 1915, at Silver City (Kellogg); at Fort Wingate May 7-8, 1888 (Shufeldt); and at Santa Fe May 6, 1903 (Chapman).—W. W. COOKE.

NEST.—Six to one hundred feet from the ground, generally in tops of tall pines, dry cottonwoods, or dead tree trunks; but also in dead limbs of sycamores, oaks, junipers, and willows. *Eggs*: Commonly 6 or 7, dull white.

FOOD.—In summer, mainly insects of various kinds, as grasshoppers, large black crickets, ants, beetles, spiders, flies, and larvae, as well as wild berries—strawberries, raspberries, service berries, and salmonberries—acorns, pine seeds, and juniper berries. In localities where grasshoppers are abundant, the Woodpeckers live on these pests almost exclusively while they last (Bendire). Investigation by Professor Beal of complaints of injury done to orchards disclosed only two cases of serious damage. In a California orchard, where the birds were shot on sight, it proved that they had been picking open the apples for codling moth worms, taking the fruit that had wormholes! In fall and winter they eat large quantities of acorns; also woodbine and five-finger berries.

GENERAL HABITS.—With no white patches on the back to confuse it with others of the family and with its long oval wings and short tail to give it distinctive flight, the Lewis Woodpecker is easily recognized, whether flying crow-like across the landscape or, in pursuit of some hapless insect, describing a parabola from a fence post. Where numbers of them were seen hunting in the Dulce region, over the high pine ridges, in some places Mr. Ligon found them almost constantly in sight, plucking insects from the air, often making two or three captures before gliding to some dead pine top.

Near at hand the recognition of the beautiful bird is accompanied by one of the rare thrills known to bird lovers. One of these thrills Doctor Cooper experienced, for he exclaims with enthusiasm: "As it wheels and flutters slowly around the trees, the brilliant metallic green and rich carmine flash in the sun like the fiery tints of the hummingbird" (1860, p. 162). During one fall migration at Tucson, Herbert Brown saw a notable sight—"not less than fifty of the Woodpeckers circling through the air, at an elevation of about 500 feet, with all the ease and grace of the Falconidae" (1902, p. 81).

Like the social acorn-eaters, attracted in summer by grasshoppers and in winter by the same fortuitous combination of acorn-bearing oaks

and convenient pines, this second acorn-eater may be found in large flocks. In August Dr. J. C. Merrill has found migrating flocks of one or two hundred searching in the fields and along the roadsides for grasshoppers, "at a little distance easily mistaken for blackbirds" (1888, p. 256). And in winter when on the Wheeler Survey, on the way between Fort Tularosa and Fort Craig, Mr. Henshaw found "a very large colony of them in a snug, sheltered valley, where they had congregated from the neighboring mountains. . . . Extensive oak groves were interspersed here and there with a tall pine "which bore over its body the marks of the persistent attacks of the Woodpeckers, who had, perhaps, resorted hither, season after season, for a long term of years. Within a comparatively small area, there must have been at least a hundred of these birds gathered together, and all combined to make a very happy, noisy family party. Food appeared to be abundant, and obtainable with very little labor, so that there remained plenty of time for play, and they made as joyous a company as one need care to see. They kept up a continual chattering as they chased each other about, which was always good-natured in its tone" (1875, pp. 397-398).

Just how much storing of acorns is done by the Lewis Woodpeckers in migrating is one of the interesting questions to be studied. Near Largo Canyon, October 5, 1906, we saw four of the birds flying back and forth from some acorn-laden oaks to a large pine, and once got near enough to see one of them come with an acorn in its bill and try to wedge it into a hole in the tree. There were only a few acorns in holes in the bark, however, as far up as we could see. As an acorn-eating Mearns Woodpecker was in an adjoining pine, he might have been responsible for some of the filled holes. In California John M. Welch wrote of large migrating flocks of Lewis Woodpeckers seen among the oaks, and said, "I would like to know why these birds store up so much food and then leave it for other birds to eat, for certain it is that they are not here to eat it themselves." He speaks of the presence of the California acorn-eater, however, in the same oaks, and says, "the little Californian Woodpecker resents the intrusion and may often be seen sprinting after its big cousin, with malice in every movement" (1899, p. 29). So perhaps in this case, also, the hoarding was largely done by the resident woodpecker rather than the migrating one.

There is an instance of the storing of shelled acorns quoted by Mr. Brewster in which a Lewis Woodpecker in Colorado was seen storing acorns in November, not in the manner of the Mearns Woodpecker, an unshelled acorn to a hole, but five or six acorns wedged into one half-finger hole or a much larger number in a nest-like hole (1898, p. 188). An interesting description of this method of storing is given by Mr. Michael who watched one in the Yosemite, discovered when "making trips back and forth between a Kellogg oak and his home tree, a cottonwood. He

was busy storing away his winter supply of acorns. Occasionally he picked a fallen acorn from the ground; more often he flew into the lesser branches of the oak, and hanging like a great black chickadee he plucked the acorn from the cup. With crow-like flappings, his broad wings carried him back to the dead cottonwood with his prize in his bill. Alighting somewhat below the summit of his tree he would, by a series of flight jumps, come to a certain shattered stub where a fissure formed a vise. Into this he would wedge the acorn.

"With the acorn held firmly in place he would set about cutting away the hull, and strong strokes of his bill would soon split away the shell and expose the kernel. But he was not satisfied in merely making the kernel accessible, he must go on with his pounding until he had broken it into several pieces, and then with a piece in his bill he would dive into the air like a gymnast, drop twenty or thirty feet and come with an upward swoop to perch on the trunk of the same tree. A few hitching movements would bring him to a deep crack that opened into the heart of the tree. Here he would carefully poke away, for future reference, his morsel. Usually the acorn was cut into four parts, involving four such trips, and on the last trip to the vise he would take the empty hull in his bill, and with a jerk of his head, toss it into the air. An examination of the ground beneath the tree disclosed hundreds of empty acorn shells. Holding a watch on the Lewis Woodpecker, we found that he made five trips in five minutes and stored five acorns" (1926, p. 69). Major Bendire also quotes an instance of numbers of May flies being gathered and stuck in cracks in the bark of the nesting trees of the Lewis. Here, of course, the problem is a different one, as the insects could be eaten before the birds left the neighborhood.

The real questions raised by what seems to be a quasi-storing habit in the Lewis Woodpecker are the utility of the storing habit in migratory birds and the correlation of the two habits—the question whether the storing habit could have antedated the migratory habit, leaving an outgrown instinct such as is seen in the case of nut-fed squirrels who continue to store regardless of their needs; a question which raises still another—will the outgrown instinct gradually disappear?

ADDITIONAL LITERATURE.—FINLEY, W. L., Educational Leaflet 112, Nat. Assoc. Audubon Soc.

RED-NAPED SAPSUCKER: *Sphyrapicus varius nuchalis* Baird

DESCRIPTION.—*Length:* 8-8.7 inches, wing (male) 4.9-5.1, tail 3.1-3.4, bill .9-1. Inner hind toe extremely short. *Adult male:* Back of head black between red of crown and nape; rest of upperparts black, back with two broken white stripes, tail black, middle feathers white with oblique black bars; wing coverts with long conspicuous white patch, primaries banded with white; sides of head with white stripes; chest with a black band between red of throat and pale yellow of belly. *In fall and winter:* White markings on upperparts of summer male replaced by yellowish

or brownish; yellow of underparts deeper, sides brownish; iris brown, bill blackish, legs and feet greenish. *Adult female*: Similar to adult male, but duller, top of head sometimes wholly black, sometimes marked with white; chin white, throat more or less red, and chest mottled gray. *Young*: Duller, red of head and throat wanting or only suggested, red largely replaced by brown or slaty, black of breast wanting or obscure.

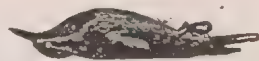


FIG. 69. Red-naped Sapsucker, skin

RANGE.—Breeds in Boreal and Transition Zones from central British Columbia and southern Alberta south to western Texas, central New Mexico, and northeastern California; winters from northern California and New Mexico south to Jalisco and Durango, casually to Guatemala. Casual in migration east to Kansas.

STATE RECORDS.—In the mountains of the northern part of New Mexico the Red-naped Sapsucker occurs at the middle altitudes. [On June 22, 1919, very young birds were found in a nest at 7,800 feet on Pot Creek about 12 miles southeast of Taos (Ligon); and nests were found at from 8,000–9,000 feet in northern Santa Fe County (Jensen, 1922). It was observed June 16, 1924, in Uraca Canyon southeast of Cimarron (Ligon).] Young out of the nest were being fed July 11, 1904, at 7,400 feet on Pueblo Creek in the Taos Mountains, and the species was seen July 13–20 on the Pecos River at 8,000 feet (Bailey), where it had been found as a common breeder in July, 1883 (Henshaw). It was not rare among the aspens below 9,000 feet in the Zuni Mountains, June 12–26, 1909 (Goldman). [In the south-central part of the State, on the east side of the White Mountains, 8 miles west of Alto, Lincoln County, at 7,800 feet, a nest with fresh eggs was found June 4, 1926, a southern record for the State east of the Rio Grande. In the south-western part of the State it is rather common in the Black Range, where one nest was found, June 26, 1920, in an aspen near Diamond Peak, 16 miles southwest of Chloride, and two nests, June 28, in aspens in Black Canyon, 30 miles southwest of Chloride; all three nests containing young (Ligon).]

In the fall, old and young range high in the mountains at least to 10,700 feet, at which altitude in the Culobra Mountains, they were noted August 21, 1904 (Gaut). During migration the species ranges over southern New Mexico and to central Mexico. It was one of these migrants taken near the Mimbres River by Doctor Henry which served as the type of the species *nuchalis*. Late migrants were seen in the northern part of the State, October 20, 1883, at Willis (Henshaw); and October 22 and 29, 1908, at Fruitland (Birdseye). Farther south they were seen October 6–12, 1908, at Gila (Goldman); October 19, 1906, on Willow Creek in the Mogollon Mountains (Bailey); and November 1, 1904, at Kingston (Metcalf). In the Manzano Mountains, they were found fairly common in the foothills October, 1903.

[In winter, they are reported common in wooded sections of the southern half of the State; "the colder the winter, the lower down they occur" (Ligon, 1919). A specimen was taken, December 2, 1917, at Silver City (Kellogg)]; and one taken January 9, 1900, at Albuquerque (Birtwell).—W. W. COOKE.

NEST.—Generally in trunks of living aspens, 5 to 30 feet from the ground. *Eggs*: Usually 4 or 5, white.

FOOD.—Of the eastern and western forms of the Yellow-bellied Sapsuckers, 313 stomachs examined contained 49.31 per cent of animal matter and 50.69 vegetable. Ants amounted to 34.31 per cent of the whole food, fruit—of little economic interest—28.06 per cent of the food, and cambium—inner bark of trees—16.54 per cent. "The damage this Sapsucker inflicts in eating the cambium and sap

of trees is so serious that it more than counterbalances any good that the bird does in other directions" (Beal).

GENERAL HABITS.—The Red-naped Sapsuckers serve still better than the Flicker as illustrations of the relation of form to habit. Although they excavate their nests, their bills are not so stout and chisel-



MAP 19. RED-NAPED SAPSUCKER

Shaded areas show general range. Triangles mark breeding and breeding season records

like as those of the hairy, downy, and three-toed forms; while their tongues instead of being greatly extensible and barbed for extracting wood-boring larvae are short, practically nonextensible and tipped with a brush of stiff hairs, enabling them to swab up ants and suck sap. The familiar girdles of squarish holes seen on tree trunks in their territory blaze the trees they have visited and give a clue to their abundance

and the extent of the damage they are doing in the region. If the total injury is serious it is peculiarly important to recognize them as the offenders and not visit their sins upon the innocent conservators of the forest. If necessary to do away with them locally they may be readily poisoned by putting powdered strychnine into the fresh sap pits. If fresh girdles are watched the birds may be found at their vigils, sipping sap and eating the insects their sugar-baited traps have decoyed. One of the Red-naped Sapsuckers shot in Santa Clara canyon, when feeding around a reddish zone of fresh holes in a birch, had its stomach full of small insects.

On Pueblo Creek, near Taos, where a pair were feeding young out of the nest, my attention was attracted by seeing one of the parents repeatedly fly obliquely from the tree to the ground, and on investigation I discovered an ants' nest. At that time the birds, so noisy earlier in the season, were, of course, guardedly quiet, giving for the most part only a weak call.

In summer, Mr. Ridgway found, the Red-napes' favorite haunts are the groves of large aspens. In summer, at Santa Fe, Mr. Jensen has often found them visiting the Indian School campus (1923b, p. 457).

ADDITIONAL LITERATURE.—MCATEE, W. L., Biol. Surv., U. S. Dept. Agr., Bull. 39, Plate I and pp. 98-99, 1911.—SAUNDERS, A. A., Condor, XII, 200, 1910.

ROCKY MOUNTAIN SAPSUCKER: *Sphyrapicus thyroideus nathaliae* (Malherbe)

PLATE 38

DESCRIPTION.—Length: 9-9.7 inches. *Adult male:* Upperparts black with large white rump and wing patches; sides of head with white streaks; throat with red stripe, chest black; belly yellow; iris reddish brown, bill black in summer, purplish slaty brown in winter, legs and feet grayish olive. *Adult female:* Entire body barred with brown or black and white, except for brown head, white rump, and, rarely, a red median stripe on throat; chest usually with a black patch; middle of belly yellow. *Young male:* Color pattern like that of adult male, but black duller (often marked with white on back), throat stripe white, breast and belly paler, sides and flanks barred with dusky. *Young female:* Similar to adult female, but bars less sharply defined, color areas paler, and black patch always (?) wanting.

RANGE.—Breeds in Upper Transition and Canadian mountain forests from southern Montana south to New Mexico and Arizona; winters in Arizona, New Mexico, western Texas, and south to Jalisco, Mexico.

STATE RECORDS.—The Rocky Mountain form of the Williamson Sapsucker breeds at high altitudes in the quaking aspens in the mountains of New Mexico. A nest was found at 9,800 feet west of Las Vegas May 30, 1898 (Mitchell). [It was nesting commonly in the Carson Forest west of Tres Piedras about 8,000 feet (1916-1918), fairly commonly in the Sangre de Cristo Range from 9,000-10,000 feet (1919), and several nests containing young were found in the divide country between Pot Creek and Rio Chiquito southeast of Taos June 20-26, 1919, from 9,000-9,500 feet (Ligon). At Lake Burford, it was fairly common and nesting, May to June, 1918 (Wetmore); and at 8,000 feet in the Black Range, 20 miles west of Hermosa, a nest was found on July 6, 1917, in an aspen among dense conifers (Ligon).] The

species was noted at 9,000 feet on Bear Ridge in the Zuni Mountains June 15, 1909 (Goldman); and at 9,500 feet near Willis July 14, 1903 (Bailey).

In the fall, on September 4, 1906, it was found up to 10,500 feet on Santa Clara Mountain (Bailey); down to 7,200 feet in the Burro Mountains September 20, 1908 (Goldman); and at about the same altitude near Apache (Hachita), September 30, 1889 (Anthony). It remained at 9,900 feet at Hopewell to September 7, 1904,



MAP 20. ROCKY MOUNTAIN SAPSUCKER

Shaded areas show general range. Triangles mark breeding and breeding season records

was still present October 14, 1903, in the Manzano Mountains (Gaut), and October 22, 1905, in the Gallina Mountains (Hollister). A late migrant was taken on the Gila River, November 5, 1873 (Henshaw).

In winter, one was taken January 3, 1913, on the divide between Haut and Taylor Creeks in Socorro County, and one December 31, 1912, at 7,000 feet, 5 miles to the eastward in Sierra County (Ligon). (It was reported in winter from Santa Fe, Ancho, and Willis (Swarth); and was rather abundant in the timber of the higher

mountains of the State, ranging well down in the pinyon and juniper throughout the winter, to about 8,000 feet, northwest of Reserve (1919).]

In the spring, in March, 1915, it was found common in western Socorro [Catron] County from 8,000–9,000 feet, generally in juniper and pinyon but sometimes in yellow pine (Ligon). One was taken April 7, 1892, near Palomas Lake just south of the New Mexico boundary (Mearns); and one March 16, 1,900 feet at Tijeras (Birtwell).—W. W. COOKE.

NEST.—Largely in pines, firs, and aspens, 5 to 60 feet from the ground. *Eggs*: Commonly 5 or 6, white.

FOOD.—In 17 stomachs examined, 87 per cent was animal matter and 13 per cent vegetable. Of the animal contents, 86 per cent was ants, and cambium made up 12.55 per cent of the total food. The high destruction of ants is favorable, and while the cambium record is bad, the Rocky Mountain Sapsucker is "strictly an inhabitant of pine forests and aspen groves at considerable elevations, and therefore under present conditions is not likely to injure trees of great value to man" (McAtee).

GENERAL HABITS.—It was in New Mexico in 1873 that this strangely mated pair of Rocky Mountain Sapsuckers—the female brown-barred, the male black-coated—with white rump and wing patches—were found by Mr. Henshaw to be mates rather than distinct species as previously supposed (1875, p. 394). The cause of this strongly contrasted sexual coloration unique among the woodpeckers of the United States is one of the unsolved problems of ornithology that stimulates speculation and so adds zest to the study. Is it, as Mr. Swarth suggests, that the female is still in a primitive stage of development? Correlating the brown coloration of the pasture-frequenting Flickers with the ant-eating habits so marked in the Rocky Mountain Sapsucker, it would seem that the color of the female might have been ancestrally adapted to a more open habitat than that in which the pair are found to-day; or has the ant-eating habit been diverted from ants that live on the ground in the open to those that live on tree trunks? The feeding habits of the anomalous pair should be carefully studied in the field.

A female taken by Mr. Gaut on Red River, August 16, 1904, was early completing its molt, which was an interesting example of the progressive method of wing molt as contrasted with that of the ducks and geese, which lose all their wing quills simultaneously. In the left wing the fifth primary was old, its white edge spots notched out by wear; five secondaries were old, and greatly notched at the white spots, while the rest of the wing feathers, except for a patch of primary coverts, were new. The right wing showed the same sequence of molt, except that both fifth and sixth primaries were old. The stomach of the bird was full of large white wood-boring larvae. One shot by Major Goldman at 9,000 feet in the Zuni Mountains had its stomach nearly full of large winged ants and held one in its bill; while one taken by Mr. Bailey near Black Lake, September 9, when it was in fresh fall plumage, had its stomach stuffed full of black ants.

Attention was called by Doctor Merrill to a noticeable habit that the Rocky Mountain Sapsucker has of working down as well as up a tree trunk. As he said, "when one dodges around a tree, in which, by the way it is unpleasantly expert, it is as apt to reappear twenty feet below where it was last seen, as above. In all its movements it is quick and active, and gives one the impression of being thoroughly wide awake" (1888, p. 255). Its call note is given by Doctor Wetmore as a "low rattling *keh-h-h*, given in a somewhat guttural tone" (1920a, p. 399). During the nesting season, Mr. Jensen says, it can be identified by the way it pounds on a dead limb, as it strikes two blows, and after a short pause, four blows, repeating this over and over (1923b, pp. 457-458).

At Lake Burford in 1918 Doctor Wetmore found the Sapsuckers fairly common among the yellow pines on the hills. On June 2, he found a pair east of the Lake. The female was working steadily on a yellow pine, adding a new row of drill holes to a patch of pits already a foot square. The pair had a nest hole in a dead yellow pine about fifty feet from the ground, and the male remained on guard near it to prevent its being usurped by House Wrens and Violet-green Swallows, which were busy about other cavities in the same tree. "He made little demonstration save to fly down to the hole and look in when one of the other birds came near it, but this was sufficient, for they remained at a safe distance" (1920a, p. 399).

ADDITIONAL LITERATURE.—SAUNDERS, A. A., Condor, XII, 203-204, 1910 (nest).—SWARTH, H. S., Condor, XIX, 62-65, 1917 (geographic variation and coloration).

ROCKY MOUNTAIN HAIRY WOODPECKER: *Dryobates villosus monticola*
Anthony

PLATE 38

DESCRIPTION.—*Male*: Length (skins) 8.5-9.3 inches, wing 5.1-5.3, tail 3.1-3.5, bill 1.1-1.3, tarsus .8-1. *Female* slightly smaller. *Adult male*: *Upperparts black, with scarlet nuchal band, white median stripe down back; tail with four middle feathers black, next pair black and white, two outer pairs entirely white; wings spotted with white (coverts sometimes plain black); sides of head with black band enclosed by two white bands; underparts white; iris reddish brown, bill grayish horn color, legs and feet grayish.* *Adult female*: Like male, but without red on head. *Young male*: Like adult male but without red nuchal band and with the crown usually streaked or spotted with pale red (sometimes yellowish or pinkish), the colored feathers often marked also with white. *Young female*: Like young male, but crown marked only, if at all, with white.

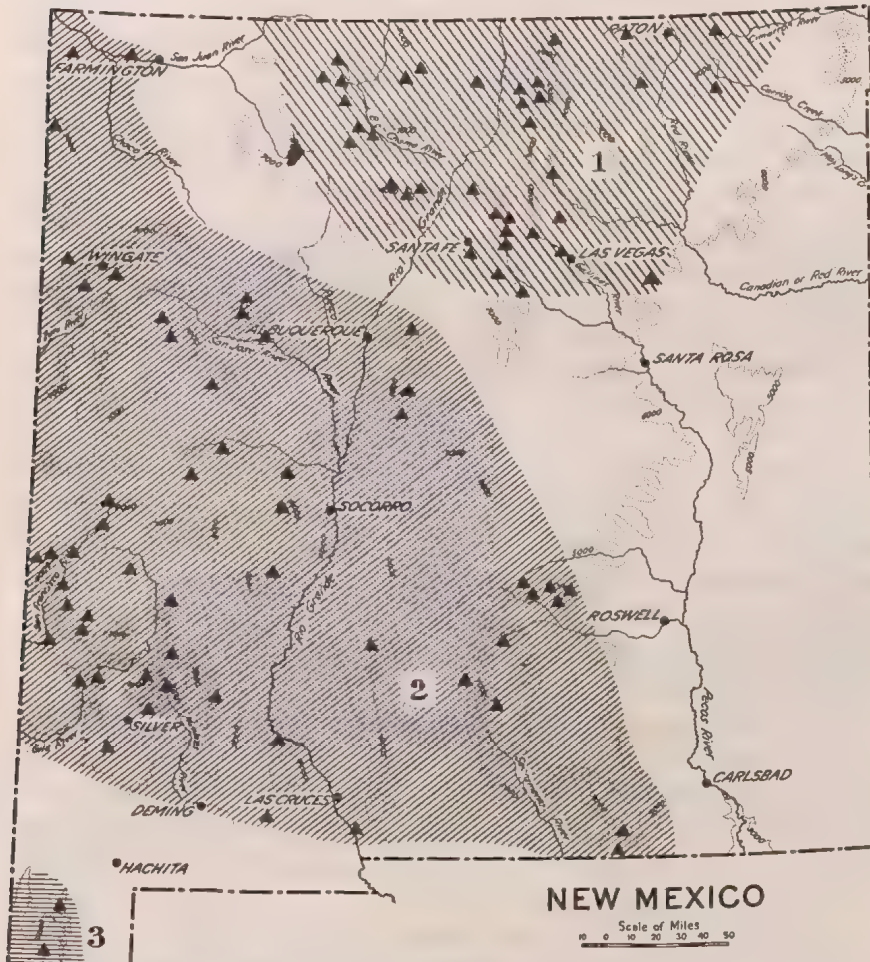


FIG. 70. Foot of Hairy Woodpecker

COMPARISONS.—Of the three forms of Hairy Woodpecker that occur in New Mexico, the most northern, Rocky Mountain, is the largest; the most southern, Chihuahua, the smallest. In the Chihuahua, the white underparts are mainly brownish; in the White-breasted and Rocky Mountain, white. (See pp. 403, 404.)

RANGE.—Apparently resident, except for vertical migration, in Canadian and Transition Zones of Rocky Mountains from British Columbia, east of Cascades, eastern Washington, Montana, and western Nebraska south to northern New Mexico and Utah.

STATE RECORDS.—Ranging north to the northern boundary of the United States and beyond, the Rocky Mountain Hairy Woodpecker breeds south to northern New Mexico, and specimens representing this form have been taken at Oak Canyon in the Raton Range, Sangre de Cristo Mountains, September 1, 1903 (Howell); Willis, April 22, 1900 (Birtwell); Pecos Baldy August 3-15, 1903, at 11,000 to 11,600 feet (Bailey); [distributed over the entire Sangre de Cristo region from the yellow pine belt up (Ligon, 1919)]; noted near Koehler Junction, September 17, 1913 (Kalmbach); Lake La Jara, 7,800 feet, September 19, 1904 (Gaut). [At Lake Burford fairly common and nesting, May-June, 1918 (Wetmore).] It was noted at 7,500 feet near Glorieta July 7-10, 1903, and in Santa Clara Canyon of the



MAP 21. HAIRY WOODPECKERS

1. Rocky Mountain Hairy. 2. White-breasted Woodpecker. 3. Chihuahuan Woodpecker. Shaded areas show general range. Triangles mark yearlong records of mainly resident forms

Jemez Mountains at the same altitude August 25, 1906 (Bailey), which probably is about as low as it breeds in New Mexico, being therefore confined to the middle and higher altitudes; how high up in the mountains it remains through the winter has not yet been determined, but it is apparently non-migratory, except for a slight vertical migration in the higher mountains.—W. W. COOKE.

NEST.—In holes in trees. *Eggs*: 3 to 6, white.

FOOD.—In 382 stomachs of the various forms of hairy woodpeckers examined, 77.67 per cent of the contents was animal matter and 22.33 vegetable. The vegetable matter contained seeds, miscellaneous substances, and less than a fourth, fruit, mostly wild berries. Over 31 per cent of the animal matter was larvae of the destructive woodboring beetles, of which one stomach contained 100. Ants amounted to 17 per cent and caterpillars about 10 per cent, many of them wood-boring species. "It is a bird from which the orchardist and forester have nothing to fear and much to gain" (Beal).

GENERAL HABITS.—Except when feeding noisy young in a tree trunk or going about with a vociferous family, the Rocky Mountain Hairy Woodpecker with its white stripe down its black back, plastered on the side of a tree, may easily be overlooked in the coniferous forest where it makes its home; and where, silent and solitary, it unobtrusively goes about its business, ridding the trees of their hidden enemies. Equipped with its strong climbers it scales the trunks with perfect ease, going up with short hops and between jumps propping itself up—especially when stretching back for a sledge-hammer blow—by means of the stiff feathers of its tail. The feathers, by molting time, show the result of this hard usage. In one specimen taken September 27, at Lake Burford, not only were the tail feathers greatly abraded, but the shaft of one was split.

In the date and method of molting decided irregularity was shown in six specimens secured. In two, the wing quills had been molted before the tail, while in four others the process was apparently going on simultaneously. In one bird the round white spots on the old secondaries had, as is frequently seen, given way before the black part of the feather, looking as if cut out with a punch. One of the birds collected on August 25 was mainly in fresh fall plumage, but one taken September 28 was mainly in pinfeathers.

Nesting time comes late in the high mountains. In the Sangre de Cristos at an altitude of 11,000 feet, on June 21, 1920, Mr. Jensen found a nest with noisy young thirty feet up in a large quaking aspen, which stood on the edge of an avalanche slide. The following year, on May 22, he made his way through four feet of snow to the same tree and this time found a nest with fresh eggs.

A family of young, which were going about by themselves on August 16, at 11,600 feet at the foot of Pecos Baldy, picking on the dead trees and drumming precociously, came around camp and drove off a family of Three-toed Woodpeckers, which more rightfully belonged at that high

altitude, doing it all with the lordly, self-conscious air a young woodpecker assumes before he has forgotten his egg shell.

In the dark woods, the white back stripe and the red head patch of the Hairy and Downy may well have their uses in keeping families together, for, in dim light, a patch of white or red catches the eye surprisingly.

WHITE-BREASTED WOODPECKER: *Dryobates villósus leucothorétis*
Oberholser

DESCRIPTION.—*Male:* Length (skins) 7.9–9.2 inches, wing 4.9–5.1, tail 3–3.4, bill 1.1–1.3, tarsus .8–.9. Female slightly smaller. Like the Rocky Mountain Hairy Woodpecker but *decidedly smaller*, and wing coverts almost always *without white spots; entire underparts pure white*.

RANGE.—Apparently resident except for vertical migration in Canadian and Transition Zones in the mountains of the interior southwestern United States, including southern Utah, western and central Arizona, and middle New Mexico south to central western Texas (Guadalupe Mountains).

STATE RECORDS.—The type of this form of the Hairy Woodpecker was taken September 19, 1905, at Burley, New Mexico, and the subspecies is confined principally to New Mexico and Arizona. In the former State it occupies nearly all of the area south of the preceding form *monticola*, north, at least to Fruitland, October 21, 1908 (Birdseye); the San Mateo Mountains, August 14–15, 1905 (Hollister); and San Pedro July 4, 1889 (Bailey); east to the Manzano Mountains, November 12, 1903 (Gaut); Mount Capitan, June 13, 1899 (Bailey); and Clouderoft, July 18–20, 1901 (Fuertes). The extreme southeastern extension is found in the Guadalupe Mountains, August 19, 1901 (Bailey); while the form as a breeding bird ranges south to the southern part of New Mexico in the Black Range and San Mateo Mountains, 6,000–8,000 feet (Ligon); at Silver City (Marsh and Kellogg); and the Burro Mountains (Goldman).

Young in the nest were found at Silver City, 6,000 feet, May 11, 1885 (Marsh); [on Chloride Creek at 6,300 feet May 16, 1916 (Ligon)]; and on June 13, 1899, the species was taken at about 6,000 feet near the base of the Capitan Mountains. This is probably about as low as it breeds, ranging thence upward to an altitude not as yet determined; but, when the young are full grown, both old and young are common well up toward the summits of the mountains, at least to 10,500 feet on White Water Baldy in the Mogollon Mountains, October 16–31, 1906 (Bailey), and to about the same altitude in the Capitan Mountains, August 11, 1903 (Gaut).

It is probable that these extreme heights are deserted in the winter, but as late in the season as November 4, 1909, one was taken at 9,000 feet near Kingston (Goldman); and on December 10, 1903, one was noted at 8,100 feet in the Manzano Mountains (Gaut). In the Guadalupe Mountains it was common above 5,500 feet, in January, 1915 (Willet); and in the same region south of Queen several were seen December 31, 1915 (Ligon); although during the fall and winter some descend to the bottom of the river valleys even to Fort Fillmore (Henry); Gila (Goldman); and Glenwood (Bailey); [on White Water Creek one was noted October 1, 1916 (Skinner).]—W. W. COOKE.

NEST.—Generally in small trees in canyon beds (Ligon).

GENERAL HABITS.—A White-breasted Woodpecker taken at Cliff on the Gila on November 8, 1906, was in surprising plumage for the date,

some of the black feathers on its wings and back being brown, they were so old and sunburned; but this was probably due to some abnormal conditions of the individual without relation to the date of normal molt for the species.

Along Dry Creek, in October, 1908, when Major Goldman found the birds rather common among the oaks, he writes: "One afternoon I found one pecking at a hole near the ground in the trunk of an oak. It worked for a second or two and then paused long enough to look in my direction, beginning work again immediately. This was repeated several times and it seemed disinclined to leave the spot, allowing me to approach to within ten feet when, instead of flying off, it slid around to the opposite side of the trunk while I examined the place and found the hole inhabited by numerous small black beetles which were running excitedly about. I moved off a short distance and watched the Woodpecker return to the hole which seemed to be a rich find" (MS).

On Chloride Creek in May, 1916, when Mr. Ligon was standing by a half dead box elder containing a woodpecker nest, the mother came with her bill for half its length jammed full of wood ants for the squawking young inside the hole (MS). One that Mr. Kellogg took at Silver City had recently eaten two woodboring larvae, six caterpillars, and at least ten moth pupae, besides other insects and mast.

CHIHUAHUA WOODPECKER: *Dryobates villósus icástus* Oberholser

DESCRIPTION.—*Male:* Length (skins) 7.3–8.4 inches, wing 4.6–5.5, tail 2.6–3, bill 1–1, tarsus .8. *Female* slightly smaller. *Adult male:* Upperparts, including middle tail feathers, black; with scarlet nuchal band, white median stripe down back, mainly white outer tail feathers, white spotting on wing quills, and white lower belly; stripes enclosing black streak back of eye, and entire underparts, except lower belly, brownish gray.

RANGE.—Transition and Canadian Zones in the mountains of southeastern Arizona, southwestern New Mexico, and northwestern Mexico south to Nayarit, Jalisco, and Zacatecas.

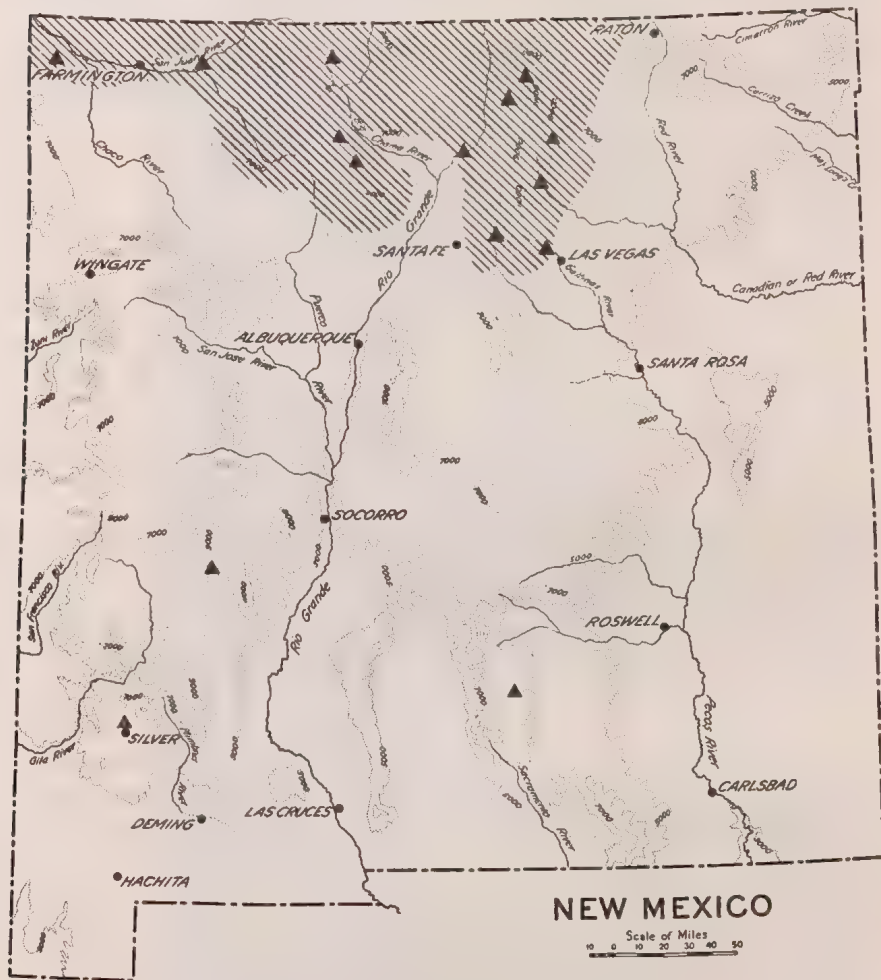
STATE RECORDS.—The Chihuahua Woodpecker was found, August 2, 1908, on Animas Peak, Animas Mountains (Grant County), at 8,000 feet (Goldman); and September 29, 1893, on the western side of the San Luis Mountains (Mearns),

BATCHELDER WOODPECKER: *Dryobates pubescens homórus* Cabanis and Heine

DESCRIPTION.—*Male:* Length (skins) 5.7–6.6 inches, wing 3.7–4.6, tail 2.2–2.6, bill .6–.7, tarsus .6–.7. *Female* as large or larger. *Adult male:* Upperparts black, with scarlet nuchal band, white stripe down back, tail with four middle feathers black, the next black and white and the two outside pairs white, usually slightly marked with black; wing quills spotted with white, coverts with little or no spotting; underparts white; iris brown or reddish brown, bill horn gray, legs and feet olive-gray. *Adult female:* Similar, but nuchal band white and black instead of scarlet. *Young male:* Similar to adult male but without red nuchal band, and with back of head and crown marked with red, and crown often dotted with white, underparts sometimes more

or less streaked on chest and flanks. *Young female*: Similar to adult male but without red on head.

COMPARISONS.—The Downy Woodpeckers of various geographic forms are smaller counterparts of corresponding geographic forms of the Hairy with the white stripe down the back and the red patch on the back of the head; differing



MAP 22. BATCHELDER WOODPECKER
Yearlong records, mainly in Transition Zone

from them only in size and the color pattern of the outer tail feathers, which are white in the Hairy and barred with black in most of the Downy Woodpeckers, although in this Rocky Mountain form there is a tendency to reduction or absence of bars.

RANGE.—Apparently resident in Canadian and Transition Zones from British Columbia, east of Cascades, to Montana, extreme eastern Colorado, and western Nebraska, south to New Mexico, and eastern California.

STATE RECORDS.—The form of the Downy Woodpecker breeding in New Mexico was separated in 1889 by Batchelder under the name *oreoecus* with the type from

Las Vegas. Later it was ascertained that this form was the same as the breeding bird of northeastern California which had been previously described as *homorus*. It is not nearly so common in New Mexico as in most of the rest of the United States, but occurs locally over much of the northern part of the State; Clapham, December 8, 1893, a pair (Seton); south to near Las Vegas, 6,500 feet (Batchelder); Willis, 7,000 feet (Henshaw); Gallinas Mountains, about 8,500 feet, early in October, 1904; Horse Lake, 7,800 feet, September 24, 1904 (Bailey); Blanco, 6,000 feet, November 16, 1908 (Birdseye); and Shiprock, 5,000 feet (Gilman). In addition the species was noted near Black Lake at 8,000 feet September 7, 1903, and on the east slope of the Taos Mountains at 8,800 feet September 17, 1903 (Bailey); also at Rinconada, 5,600 feet, May 3, 1904 (Surber). The breeding range is thus seen to lie principally between 6,000 and 8,000 feet. [On the Penasco River a few miles east of Mayhill a young bird was taken in October, 1917, and on June 28, 1920, two nests were found in aspens in the Black Range, 30 miles southwest of Chloride at 7,200 and 7,800 feet. Both contained young (Ligon). At Silver City a specimen was taken, May 19, 1918 (Kellogg).]—W. W. COOKE.

NEST.—In holes in trees, 5 to 50 feet from the ground. *Eggs*: 5 or 6, white.

FOOD.—In 723 stomachs of the various forms of the Downy Woodpecker examined the contents was 76.05 per cent animal matter and 23.95 per cent vegetable. The vegetable matter consisted mainly of acorns and nuts, wild fruits and poison *Rhus* seeds. The animal food consisted of ants, 21.36 per cent; caterpillars, 16.50 per cent; wood-boring larvae, 14 per cent; bugs, 8.57 per cent; weevils, 3 per cent; scales and plant lice, 2.85 per cent. In Montana it has been found locating the burrows of the flat-headed apple-tree borer and extracting them in numbers, and it is the arch enemy of the codling moth, doing away with the larvae in winter and so preventing the destruction of the apple crop. It also destroys over-wintering larvae of the European corn borer. The only complaint against it is its dissemination of poison *Rhus* seeds, but in winter they tide it over a shortage of other food, so enabling it to do its important work for the forester and orchardist. Its insect food is "almost all of species economically harmful," and it stands as "one of our most useful species" (Beal).

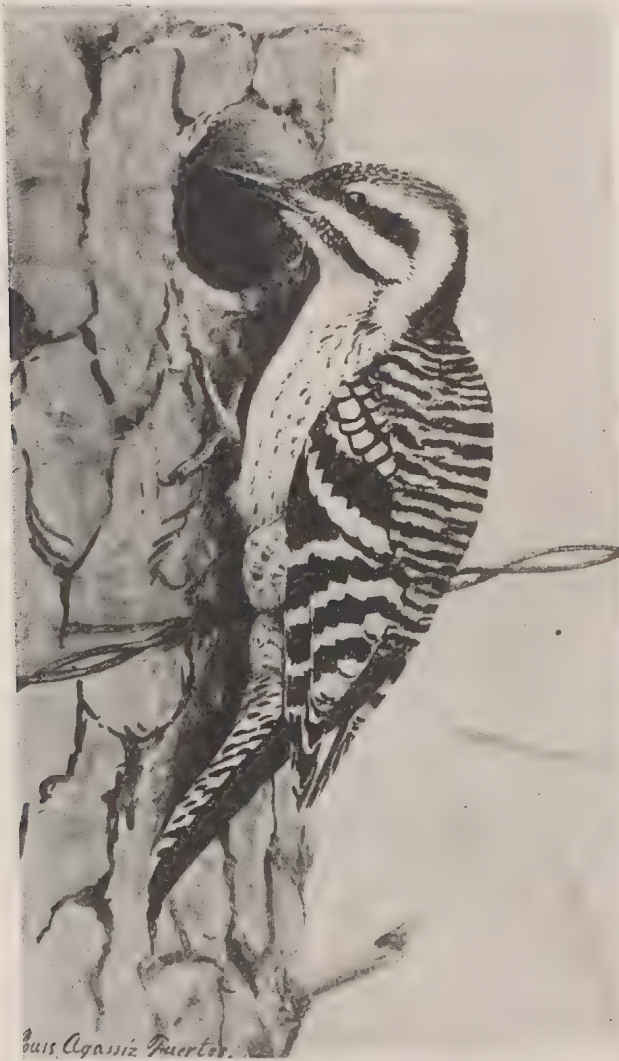
GENERAL HABITS.—One of the little Batchelder Woodpeckers was taken from a willow tree at Horse Lake, September 23, 1904, in beautiful fresh fall plumage, though a few wing and tail quills were not full grown and a few pinfeathers were scattered over the body.

The voice of the Downy Woodpeckers while resembling that of the Hairy Woodpeckers corresponds with their size, being neither so loud nor so sharp. Although found in the yellow pines and even in the spruce forests, the Downies prefer rather open and cultivated country, and are among the most useful birds that visit the orchards. After the summer visitors have gone the social little Downies go about with flocks of chickadees, nuthatches, creepers, and sometimes kinglets, which, as Professor Beal says, are "bound together by a community of interest in the matter of food, for they all forage over the bark of the trunks and branches of trees and eat practically the same things" (1911, pp. 17-18). While the Hairy Woodpeckers are shy silent birds of the forest, the little Downies at times come about the homes of men where their calls become pleasantly familiar.

ADDITIONAL LITERATURE.—PEARSON, T. G., Educational Leaflet 55, Nat. Assoc. Audubon Soc.

CACTUS WOODPECKER: *Dryobates scalaris cactophilus* Oberholser

DESCRIPTION.—Length: 7-7.7 inches, wing 3.9-4.2, tail 2.4-2.7, bill .8-.9. *Adult male:* Forehead smoky, cap to nape red, the red of the feathers preceded by specks of



From Biological Survey

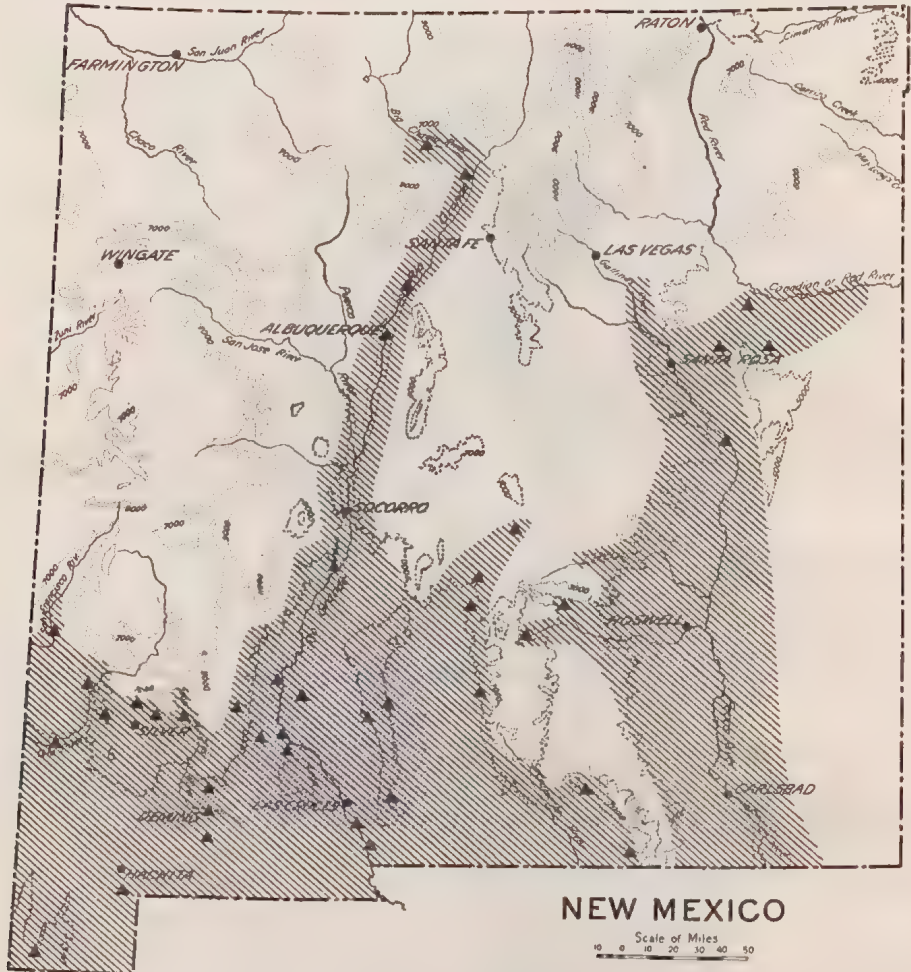
FIG. 71. Cactus Woodpecker

The little "ladder-backed" father of the family at the nest hole just above the top fence wire

white; rest of upperparts barred with black and white, except for four black middle tail feathers; side of head white, with a black stripe from bill under eye; underparts smoky, lightly spotted with black; iris brown or red, bill horn-color, legs and feet olive-green. *Adult female:* Similar to adult male but head without red. *Young*

male: Similar to adult male but red only on crown, markings less sharply defined.
Young female: Similar to young male but usually with less red on crown.

RANGE.—Apparently resident in Lower and also Upper Sonoran Zones from southern California, southern Nevada, Utah, Colorado, and central-western Texas south to northern Mexico.



MAP 23. CACTUS WOODPECKER

Shaded areas give general range. Triangles mark yearlong records, mainly in Lower Sonoran Zone

STATE RECORDS.—In the lower parts of southern New Mexico, the Cactus Woodpecker is fairly common up to 6,300 feet (Ligon). It breeds here so early that young were in the nest May 19, 1886, near Apache [Hachita] (Anthony). A pair was found feeding nearly grown young at Santa Rosa June 6, 1903, and thence to Montoya the species was common in the juniper belt (Bailey); it was common at Los Pinos, June 20, 1864 (Coues); and not rare at Albuquerque July 16–24, 1889 (Bailey); it is a common breeder among the pinyons at Silver City (Fisher); [was observed May 6–10, 1920, in Grant County from Silver City to the Mexican

boundary (Ligon)]; and ranges up the Gila to Cliff (Bailey); and up the San Francisco to Glenwood (Goldman). The above places represent the northern limit of the usual breeding range, but in addition one specimen was taken October 14, 1904, near Abiquiu (Bailey); the next day one was seen near Espanola, and the following day one near the Santa Clara Pueblo (Gaut). As the species is not known to be migratory, it is probable that these latter birds had nested in the immediate neighborhood. To the east it occurs in New Mexico to southeastern Union County—Clayton, October 22, one; Perico, November 16, several, and December 30, one; Clapham, October 31, one collected and December 8, 1893, a number seen—"quite common wherever there is timber" (Seton); also east to Fort Sumner, September 24, 1902 (Gaut); and ranges to about 6,000 feet in the Sacramento, White, Capitan, and Guadalupe Mountains. In the middle of winter it was found at Bear Canyon and Gold Camp, at about 6,000 feet in the San Andres Mountains (Gaut). [On the Rio Grande Bird Reserve (Elephant Butte), it was noted November 23–December 9, 1916 (Willett).]—W. W. COOKE.

NEST.—From 2 to 30 feet from the ground in holes in mesquite, screw bean, palo verde, hackberry, and China trees, willows, cottonwoods, walnuts, oaks, and other trees, telegraph poles, fence posts, and stalks of agave, yucca, and cactus. *Eggs:* Usually 4 or 5, glossy white.

FOOD.—Mainly wood-boring larvae, but also caterpillars, cottonworms, ants, codling moth larvae, and fruit of the giant cactus.

GENERAL HABITS.—These attractive little barred, or "Ladder-backed Woodpeckers" of the lowlands and river bottoms, often found among the willows and mesquites, differ from some of their relatives in being more often seen on the branches and twigs than tree trunks, and may even be seen picking up insects from sunflower and daisy-like stalks, and climbing around cane cactus without disturbance from its treacherous spines. In the winter, Professor Merrill says, the Cactus Woodpecker "is particularly busy, in valley and on mesa, hunting borers and wintering insects, getting many codling moth larvae" (MS).

Late in the fall of 1893, Ernest Thompson Seton found one in Clayton, on a solitary cottonwood—the only tree in town at that early date, 1893—"working away on the trunk . . . and stalking it from all directions were all the cats in the town" (MS).

In the warm country in which it lives, it can well afford to wear its thin summer coat late into the fall, and one that was taken on the Chama River on October 14, while mainly in fresh winter plumage, still had some old feathers, with pinfeathers on its crown.

Though so small it evidently has a strong bill, for Major Bendire found that it nests preferably in the mesquite, one of our hardest woods, having to chisel through "an inch or two of solid wood which is almost impervious to a sharp ax" (1895, p. 64). The height of the nest varies apparently with the preference of the individual builder.

By studying the strongly marked characters of individuals Mr. Willard has been led to class the little woodpecker with the birds which he thinks remain mated for life. During the consecutive seasons which

he spent in Arizona, he had a list of pairs of the Ladder-backed along the San Pedro River whose nests he could generally count on finding in certain definite situations. One pair, he says, "never dug its nest lower than twenty feet from the ground and usually selected a site that overhung the water. Another liked short stubs not over five or six feet tall. Another was partial to fence posts" (1918, p. 169):

ADDITIONAL LITERATURE.—GILMAN, M. F., Condor, XVII, 151-152, 1915.

ARIZONA WOODPECKER: *Dryobates arizonae arizonae* (Hargitt)

PLATE 38

DESCRIPTION.—Length: 7.4-8.4 inches, wing 4.4-4.6, tail 2.5-2.9, bill .9-1. *Adult male: Upperparts plain brown* except for red nuchal crescent, barring on outer tail feathers, white spots on wing quills, and white bands on side of head; *underparts white, thickly spotted with dusky.* *Adult female: Similar, but without red on nape, and with some white barring on middle of back.* *Young: Like adults of the respective sexes, but top of head brown, spotted with red.*

RANGE.—Apparently resident in Upper Sonoran Zone in mountains from southeastern Arizona and southwestern New Mexico south through Sierra Madre to Zacatecas.

STATE RECORDS.—The brown Arizona Woodpecker enters New Mexico only in the extreme southwestern part, where one was taken July 30, 1908, at 6,000 feet in the Animas Mountains (Goldman); one July 17, 1892, in the San Luis Mountains (Mearns); [one taken and several seen, June 23, 1926, in Cottonwood Canyon, west of Cloverdale, Hidalgo County (Ligon).] Thence it ranges to the mountains of southeastern Arizona and south to central Mexico. It appears to be non-migratory and confined to the mountains, where it occurs from the foothills to about 7,000 feet.—W. W. COOKE.

NEST.—In live oaks, sycamores, and maples. *Eggs: Usually 3 or 4, white.*

FOOD.—Insects and larvae.

GENERAL HABITS.—The rare brown Arizona Woodpeckers of southwestern New Mexico are largely birds of the live oaks, over whose trunks and branches they hunt diligently for insects.

In the Huachuca Mountains Mr. Swarth found them from about 4,500 feet up to 8,000 feet, though he says they are not often seen above 7,000 feet. In winter, they favor the large groves of live oaks along the foothills and at the mouths of the canyons, but at the approach of the breeding season scatter over the higher parts of the mountains. He found them very tame. A young one that visited his camp showed not only fearlessness but an investigating turn of mind. A horse was led down to the well close to the oak to which he was clinging, and when the animal began drinking he flew down and, lighting on its hind leg as on the side of a tree, hit it a vigorous rap or two. When the horse moved, he retreated to his tree but "it wasn't a minute before he was back again, this time on a front leg, where he went to work with such energy as to start the horse plunging and kicking in an effort to get rid of his curious assailant" (1904, p. 11).

ALPINE THREE-TOED WOODPECKER: *Picoïdes americanus dorsális* Baird

DESCRIPTION.—*Length*: About 9.5 inches, wing 4.6-5, tail 3.2-3.6, bill 1.1-1.3. Foot with only *one hind toe*; bill broad and flattened at base. *Adult male*: *Upperparts black* except for *squarish yellow crown patch*, delicate white streaking on top of head, white nuchal collar and *white streak down back* (rarely interrupted with transverse bars of black), white outer tail feathers, and white spots on wing quills; side of head with black and white streaks paralleling throat; underparts white, sides and flanks barred with black; iris dark red, bill grayish, feet gray. *Adult female*: Similar but without yellow on crown, and forehead and crown sometimes spotted with white. *Young*: Like female but crown more or less streaked with yellow.



FIG. 72. Foot of Three-toed Woodpecker



Photograph by E. R. Warren

FIG. 73. Young Alpine Three-toed Woodpeckers

Their three-toed feet, white head stripes, and white outer tail feathers show well in the sunlight

RANGE.—Boreal forests of Rocky Mountain region from Idaho and Montana south to high mountains of New Mexico and Arizona.

STATE RECORDS.—While the Alpine Three-toed Woodpecker, as its name implies, inhabits the upper slopes of the high mountains near timberline, it also occurs and breeds at much lower altitudes. In the Zuni Mountains it is fairly common between 8,000 and 9,000 feet, where it was noted June 15, 1909 (Goldman); July 21, 1905



MAP 24. ALPINE THREE-TOED WOODPECKER
Triangles mark all known records

(Hollister); and August 6-17, 1911 (Dearborn). [Several breeding birds were seen on top of the Chuska Mountains, 8,800-9,000 feet, June 30 and July 2, 1918 (Wetmore).] Specimens were taken at Lake La Jara, 7,500 feet, September 18, 1904; in the Manzano Mountains, at 8,100 feet, October 10 and December 10, 1903 (Gaut); and in the Jemez Mountains, 8,500-9,000 feet, September 1, 1906 (Bailey). The above localities represent probably the lower limit of the range and thence the species is found in the Pecos Mountains to 12,000 feet, August 15, 1903, in the Taos Mountains to 11,400 feet, July 20, 1904, in the Mogollon Mountains at 10,500

feet near the top of White Water Baldy, October 23, 1906 (Bailey); [taken on Gold Hill, Taos County, at 10,000 feet, November 20, 1926 (Ligon).] A specimen taken December 28, 1912, on the west side of Monument Pass in the Black Range at about 8,000 feet is from the most southern locality in the State (Ligon). The birds were seen there also in January, 1913.—W. W. COOKE.

NEST.—Two, recorded by Major Bendire, in spruce and yellow pine, 15 and 30 feet from the ground. *Eggs*: 5, white.

FOOD.—Over 75 per cent, destructive wood-boring larvae of caterpillars and beetles. The Three-toed Woodpeckers rank high as conservators of the forest, eliminating annually, as Professor Beal has estimated, some 13,675 of the grubs most destructive to forests. The scarcity of these useful woodpeckers make their protection and encouragement especially important.

GENERAL HABITS.—Rare and solitary, except in the breeding season, a Three-toed Woodpecker, distinguished at once by his unusual foot, his glossy head, and golden coronet, is discovered on a dark tree trunk in his forest home with much self gratulation. One of our camps at the foot of Pecos Baldy, at 11,600 feet, was especially favored, for a family came into the spruces to feed. An old male and a young one were seen on a tree together, the young one picking about for himself, although the old bird was digging larvae out of the live bark and feeding them to him. This was the pair discovered by a young red-capped Rocky Mountain Hairy—all well enough in himself but not to be looked at in the presence of the distinguished Alpine Three-toed—who, as they were enjoying their meal, made himself so obnoxious that they finally flew away, apparently uttering their opinion of him in good set terms as they went.

A larger enemy, a Yosemite black bear, Mr. Dixon discovered by the vigorous scolding of the parents, located a conveniently low nest of the Arctic Three-toed Woodpecker in a live lodgepole pine. In trying to get at the young, the bear bit out slabs of green wood twelve inches long and two inches wide. "The muddy stains around the inside of the nest entrance showed that he had thrust his nose into the hole repeatedly," but the wood was so hard that he finally gave up and left the birds alone.

PERCHING BIRDS: Order Passeriformes

The Perching Birds have feet perfectly adapted for grasping, both by their length, low insertion of the hind toe, and the muscular adaption of the hind toe for apposing the front ones. More than half the known birds of the world or about 13,000 belong to this order, considerably more than 400 being in North America. "In this order the high-strung life of bird nature reaches its highest development, the nervous system being acutely sensitive, the special senses keenly developed, at least those of sight and hearing, the circulation rapid, and the temperature the highest among animals" (Eaton). "All our passerine birds are born in an almost naked condition, having only a mere trace of down on the feather tracts

of the upperparts of the body. At its full development this natal down presents a soft, fluffy appearance over the cowering nestlings. It is pushed outward by the feathers of the juvenal plumage, to the tips of which portions of it may be seen adhering when the young bird leaves the nest. . . . In most cases the nestling or juvenal plumage is soon followed by the first winter plumage, but some few birds . . . wear it for two months or more. As a rule, at the post-juvenal molt, the feathers of the body and small wing-feathers are molted, while the primaries and secondaries with their coverts and the tail are retained, and it is often only by the color and appearance of these feathers that the bird of the year can be distinguished from the adult in winter. . . . The spring molt is rarely complete; more frequently it is restricted to the body feathers, more frequently still it affects only the region about the head and throat, while some species undergo no feather renewal at that season. The post-breeding molt of the bird a year old, as well as of those older, is complete" (Chapman). As a general rule the Perching Birds have *brown eyes*, and *black or brownish bills; legs, and feet*.

REFERENCES.—DWIGHT, J., jr., Sequence of Plumages and Moults of the Passerine Birds of New York, Ann. N. Y. Acad. Sci., XIII, 173-360, 1900.

TYRANT FLYCATCHERS: Family Tyrannidae

As their vocal organ is less highly developed than in the other Passeriformes, the Flycatchers are known as the songless Perching Birds. As these birds live on aerial insects, their feet are used only for perching and are accordingly small and weak, while their bills are in general broad, flattened, and lightly hooked at the tip, the wide gape furnished with flaring bristles "of service in entangling the creatures in a trap and restraining their struggles to escape" (Coues). Many of the Flycatchers eject the hard, indigestible parts of their food such as beetles' wings in the form of pellets. They have characteristically large heads, short necks, broad shoulders, and short legs; and most of our species are somberly colored, without spots or streaks (Eaton). Adapted like the Night-hawks and Swifts to catching aerial insects, they differ from them in lying in wait for their prey in some exposed position, darting out for it and circling back again; but like them they are highly migratory in habit.

REFERENCE.—BEAL, F. E. L., Food of Our More Important Flycatchers, Bull. 44, Biol. Surv., U. S. Dept. Agr., 1912.

KINGBIRD: *Tyránnus tyránnus* (Linnaeus)

PLATE 40

DESCRIPTION.—*Length:* 8-9 inches, wing 4.4-4.7, tail 3.4-3.7. Two outer wing quills cut out on inner web near tip (less in female). *Adults:* *Upperparts blackish*, slightly erectile *crest black with concealed orange or reddish patch* (smaller



From Biological Survey

KINGBIRD

In this beautiful pose of the black and white eastern Kingbird the usually concealed orange crown patch is suggested

in female); back slaty, *tail clear black tipped with white*, lateral feathers partly edged with white; wings dusky with lighter edgings; *underparts white*, chest shaded with gray. *Young*: Like adults but without crown patch, upperparts sooty or brownish slate; edgings of feathers and tip of tail brownish or buffy instead of white.

RANGE.—Breeds in Transition and Sonoran Zones from southern British Columbia, southern Mackenzie, southern Keewatin, northern Ontario, central Quebec, and Newfoundland (recorded from Labrador) south to central Florida, central Texas, eastern New Mexico, and central Oregon; winters from southern Mexico to Colombia and British Guiana, Peru and Bolivia.

STATE RECORDS.—The common Kingbird of the eastern United States breeds throughout much of Colorado and is common in the panhandle of Texas. [In New Mexico it occurs sparingly, though rather generally throughout the eastern and northeastern sections of the State where single birds were observed at various points, one 5 miles east of Las Vegas, August 8, and an adult feeding young out of the nest 6 miles northwest of Folsom, August 18, 1926 (Ligon). At Raton, a pair were breeding June 25–28, 1916 (Howarth).] It extends west to the Rio Grande where three were noted at Rinconada June 1, 1904 (Surber). [In Velarde, at the mouth of the Rio Grande Canyon about 45 miles north of Santa Fe, August 13, 1923, two adults were seen feeding young. In Santa Fe, August 21, 1923, an adult was seen and since then it has frequently been found nesting in Pojaque, Cyamunge, Santa Cruz, and San Juan Indian Pueblo (Jensen, 1926).] It was noted June 30, 1903, along the Pecos near Cuesta and two days later at Ribera (Bailey). In Colfax County it was common along the Red River, August 4, 1913 (Kalmbach).

In the fall migration it was not rare August 10–22, 1903, at Sierra Grande about 8,000 feet, 2,000 feet higher than part of the breeding records (Howell); and was common, August 29, 1913, along the Cimmaron River (Kalmbach).—W. W. COOKE.

NEST.—Large, cupped, compactly woven and matted with fibrous and disintegrated vegetable substances, sometimes mixed with wool and horse hair, placed on a horizontal branch of a tree. *Eggs*: Usually 3 or 4, white, pink, or creamy, variously and boldly spotted or blotched with reddish and dark brown and lilac markings.

FOOD.—No less than 85 per cent of the Kingbird's food consists of insects, mostly of harmful nature. It eats the common rose chafer, or rose bug, and devours blister beetles freely. It has been accused of eating honey bees to an injurious extent, but in 634 stomachs there were 61 bees, of which 51 were useless drones; and on the other hand it devours robber flies, which catch and destroy honey bees. Grasshoppers and crickets, with a few bugs, codling moth larvae, some cutworms, and a few other insects make up the rest of its animal food. Its vegetable food consists of wild fruit and a few seeds. It deserves full protection (Henshaw, 1911 and 1914).

GENERAL HABITS.—At the appearance of a hawk or crow on the Kingbird's breeding grounds all business, however important, is suddenly dropped and with angry falsetto screams the outraged landlord starts in pursuit of the offender, even though it be a mere passerby across the landscape. The raven also comes in for a full share of attention. One that we found at Ribera trying to rob a robin's nest was so stoutly set upon by Kingbird neighbors that he finally turned tail and flew away.

ADDITIONAL LITERATURE.—HAUSMAN, L. A., Auk, XLII, 320-326, 1925 (voice).—HERRICK, F. H., Home-Life of Wild Birds, 21-28, 1901.—MILLER, O. T., Little Brothers of the Air, 1-33, 1892.—PEARSON, T. G., Educational Leaflet 81, Nat. Assoc. Audubon Soc.

ARKANSAS KINGBIRD: *Tyránnus verticalis* Say

PLATE 41

DESCRIPTION.—*Length*: 8 to 9.5 inches, wing 4.7-5.2, tail 3.6-4. Tips of longest primaries gradually attenuated in male (much less in female). *Adults*: Foreparts mainly light ash-gray, fading to white on chin, crown with concealed orange-red patch (usually restricted in female), back grayish olive, tail black or blackish, in strong contrast to completely white web of outside feathers; wings dark brown, feathers edged with whitish, under wing and tail coverts like belly, canary yellow. *Young*: Crown without patch, wing-edgings brownish buff, yellow of underparts, paler.

COMPARISONS.—The three Kingbirds can be easily distinguished, the black and white eastern one with the white-tipped tail, from the gray and yellow western forms, and the Arkansas from the Cassin by its lighter gray foreparts, less strongly contrasting white chin, less abruptly attenuated primaries and blacker tail, more sharply contrasting with the white of the outside feathers. (See pp. 414, 419.)

RANGE.—Breeds mainly in Sonoran Zones from southern British Columbia, southern Alberta, southern Saskatchewan, and southwestern Manitoba east to Minnesota, Kansas, and Texas south to Chihuahua and Lower California; winters from western Mexico to Guatemala. Recorded from Wisconsin and Maine.

STATE RECORDS.—If number of records is any criterion, then the Arkansas Flycatcher is the most abundant or at least the most conspicuous and best known member of the family in New Mexico. It breeds nearly throughout the State from the lowest valleys to about 6,000 feet, being reported from Mesilla (Merrill); Roswell (Bailey); [Carlsbad (1919)]; all over the eastern section of the State, and extremely common in the Pecos Valley, from north of Roswell south to the Texas line (May 27-June 22, 1924); west slope of the Sandias, 5,000 feet (1919, Ligon); and Shiprock (Gilman); Adobe Ranch in the Animas Valley at 5,100 feet (Goldman); Lordsburg and Deming (Bailey); [in Grant County very common and building May 6-10, 1920 (Ligon); taken at Silver City about 5,800 feet, May 13, 1917 (Kellogg).] Breeding to a little above 6,000 feet, it was common in the foothills of the Capitan Mountains (Bailey); at Rinconada (Surber); and up the Pecos to Ribera, where young in the nest were noted June 26, 1903 (Bailey); nested abundantly from Carlsbad to Santa Rosa, June, 1913 (Ligon).

During the fall migration it ranges somewhat higher, to Las Vegas (Mitchell); Gallup (Fisher); Rio Alamosa at 7,500 feet (Goldman); and Vermejo Park, 8,000 feet (Howell). Fall migration begins by the middle of July and most of the birds have left the State by the end of August, though they were common near Koehler Junction to about September 15, 1913 (Kalmbach); noted at State College, September 21, 1914, and at Mesilla October 1, 1913 (Merrill). The last at Sierra Grande were seen August 20, 1903, but a few remained in Vermejo Park until September 21, 1903 (Howell). They were seen near Taos Pueblo September 24, 1903 (Bailey); at the Ruins of Gran Quivera September 27, 1903 (Gaut); at Rio Alamosa September 28-29, 1909, and a few as late as early October, 1909, at Fair View (Goldman).

On the return in the spring they first appeared at Fort Webster, March 25 (Henry); at Carlisle, April 8, 1890 (Barrell); at State College, April 13, 1915 (Merrill);



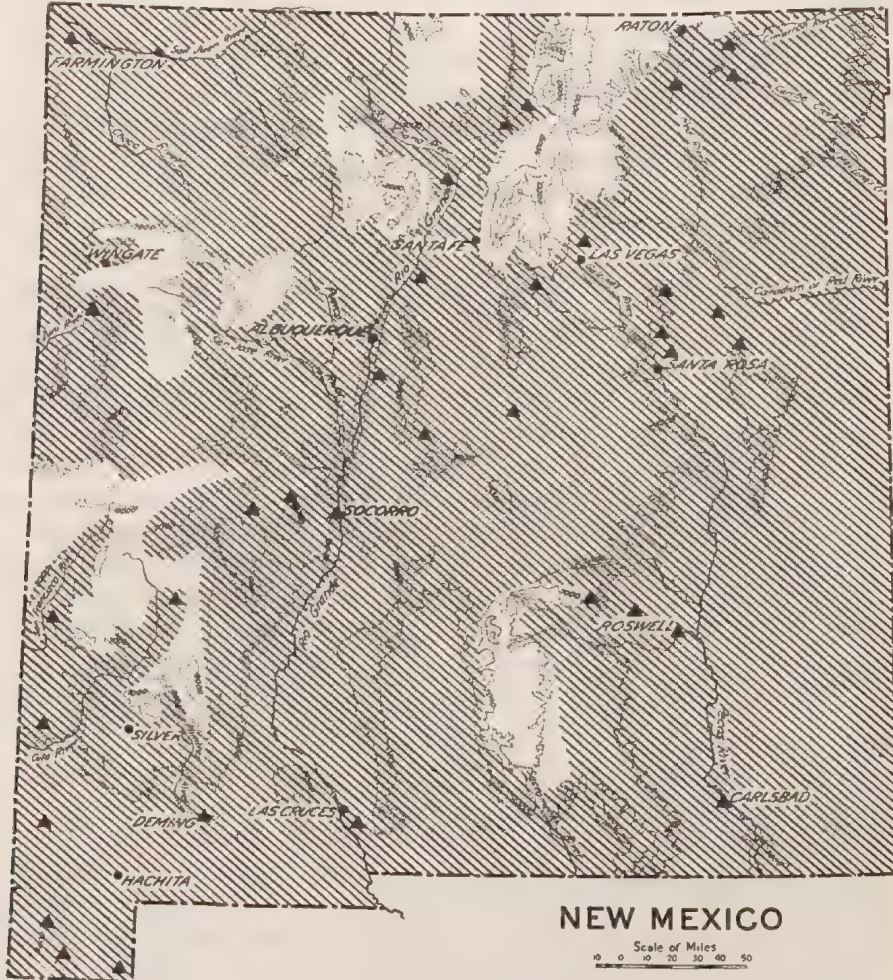
From Handbook of Birds of the Western United States

ARKANSAS AND CASSIN KINGBIRDS

The ash-gray, yellow-bellied Arkansas hovering over the darker Cassin, both loudly disputing the issue. As they hold themselves in midair, they display their diagnostic wing and tail marks—the pattern of the cut wing quills (differing again in the eastern Kingbird) and the different contrasting black and white of the tail

and at Las Vegas, April 15, 1902 (Atkins); [two were seen at Albuquerque, May 3, 1920).]—W. W. COOKE.

NEST—From 5 to 50 feet from the ground, in trees, about buildings, or in other convenient places; made compactly with foundation and outer walls of weed stems, twigs, plant fibers, and rootlets, intermixed with cocoons, down, wool, hair, feathers,



MAP 25. ARKANSAS KINGBIRD

Shaded area shows general breeding range. Triangles mark a few regional records

paper, cotton, string, or other available materials. *Eggs*: 3 to 5, white or creamy, spotted with dark brown.

FOOD.—The total yearly food examined is 87 per cent animal matter and 13 per cent vegetable, the vegetable food consisting mostly of fruit, as elder and other berries, with a few seeds; while the animal is composed almost entirely of insects. Though accused of destroying honey bees to a harmful extent, remains of bees made only 5 per cent of the food and nearly all of those were drones. Bees and wasps in general amounted to 38 per cent, grasshoppers and crickets, 20 per cent—July

28-October 24, in Colfax County, 56 per cent was grasshoppers (Kalmbach)—and beetles, mostly noxious species, 14 per cent. "The small cicada . . . is a favorite food. This bird should be strictly preserved" (Beal, 1912, p. 22).

GENERAL HABITS.—The light gray, yellow-bellied Arkansas is a typical kingbird, forceful, dominant, noisy, with a high-keyed, shrill voice and an impatient emphasis. *Keé-ah, kee-keé keé-ah* is one of his cries, and in the coyote country in early morning the iteration sometimes suggests the distant yapping of the wolf. The cries of the Arkansas are often heard overhead as he flies with quick-beating wings or, claw to claw with a rival, descends through the air. Speaking of his disposition Major Bendire says, "frequently half a dozen of these birds may be seen chasing each other about, pecking at and tumbling over each other in midair, keeping up an incessant chatter and scolding in the meantime; but very rarely have I seen feathers fly during these ostensible combats, and I am inclined to think the majority of such performances are indulged in more in fun than in anger" (1895, p. 246).

The two western kingbirds—the Arkansas and the Cassin—are often seen in the air together, as at our Aguanigra Chiquita camp near Santa Rosa, where they were both building on June 3, 1903, and the Cassin drove the Arkansas off its premises. While both birds are gray, with yellow bellies and black tails, when seen together in this way their differences come out clearly, the Arkansas being the more distinctly marked, its gray body being much lighter, its tail a keener black.

Two pairs of the light-gray Arkansas were building near camp, one in a large cottonwood beside the Aguanigra and the other in a juniper under the cliff. Both male and female were working on the juniper nest and after being gone for some time would come with a bill full of wool and pitch over the cliff to the tree, though they used some care in alighting on the stiff branches surrounding the nest.

An oddly located nest was later found in a narrow gulch under the wall of the Staked Plains, near Montoya, cleverly placed in a charred stub in a burned out cup just the right size to hold it. Made of grass and fine sticks, it was lined with wool, often found conveniently at hand in that sheep country. The trustful bird stayed near by while we examined it.

Another brooding bird was discovered on her nest in a yucca—on the dry capsules of the previous year's fruit stalk—close beside the road, at Lordsburg. Though nervous when we stopped to photograph the interesting nest, she apparently dared not leave it exposed to the sun, and while shifting about uneasily and stretching her neck to look down at us anxiously, managed to keep between the sun and her treasures.

From Mesilla Park, Professor Merrill wrote: "The noisy Arkansas Kingbird is the most numerous of the Tyrannidae . . . and is much in evidence all over the valley. It goes onto the mesa mainly to feed and is found in much fewer numbers in the mountains. The nests are placed

mostly in larger trees in the valley, and on double cross arms of telephone, telegraph, and electric light poles. Several nests on the campus are in open sight above the heads of passersby. One examined was made wholly of strings, the heavier being on the outside and the finer on the inside; the lining of feathers. The young are flying out in the first week in July" (MS).

The conveniences of civilization are accepted with common sense. One nest is reported on a telegraph pole not thirty feet from a station where ten trains passed every day, and Mr. Ligon finds that a favorite nesting place is in the V's of the mile boards on telegraph poles along the railway. Two nests found by Mr. Swarth show how easily the birds become accustomed to people. One was on a gate post close to the passersby, and the other on a post about three feet from the ground not more than ten feet from a bench by a house "where six or eight men washed three times daily, each time considering it their duty to see how the Kingbird family duties were progressing. In spite of their scrutiny the eggs hatched . . . and there was every prospect that the young would prosper" (1911b, pp. 161-162).

A story of a pet Arkansas Kingbird that spent two months with the men of the Wheeler Survey as they moved from camp to camp, even flying along on a hunting trip to the mountains, is delightfully told by Mr. Ridgway. Its insatiable appetite for grasshoppers led to a test, each member of the party keeping count of those fed to it one day, the result being that one hundred and twenty were reported! After having three such pets, Mr. Ridgway said that he knew of "no other bird so easily tamed, or which so thoroughly enjoys the society and protection of human beings, when once domesticated" (1877, pp. 528-532).

CASSIN KINGBIRD: *Tyránnus vociferans* Swainson

PLATE 41

DESCRIPTION.—*Length:* About 8.7-9 inches, wing 5-5.4, tail 3.7-4.2. *Tips of longest primaries abruptly nicked* in male, not distinctly, if at all cut out in female. *Adults:* Foreparts dark gray, chin abruptly white; crown with concealed orange-red patch (usually restricted in female); back olive-gray, tail black or brownish black tipped with lighter; outer web of outside feather grayish brown, *narrowly edged with paler*; wings grayish brown, largely edged with whitish; *under wing and tail coverts, like belly, canary yellow.* *Young:* Similar to adults but crown without color patch, wing markings buffy, and coloration duller. (See Arkansas Kingbird, Comparisons, p. 416.)

RANGE.—Breeds mostly in Upper Sonoran Zone from southwestern California and southern Wyoming south to western Texas, New Mexico, Arizona, and Michoacan; winters from southern California and northern Mexico to Guatemala; casual in Oregon and northern California.

STATE RECORDS.—The breeding range of the Cassin Kingbird extends up into the yellow pines of the Zuni Mountains, where it was taken June 26, 1909, on Bear Ridge at about 8,000 feet (Goldman); a month later, July 23, 1905, it was

found common in the same mountains, at the same altitude near Agua Fria Spring (Hollister). [At Lake Burford in Rio Arriba County it was fairly common, May 25 to June 19, 1918 (Wetmore).] On June 24, 1902, one was taken at 8,000 feet on the southwestern slope of the Capitan Mountains, though the bulk of the species, which was an abundant breeder, was found somewhat lower (Gaut). It nested June 25, 1903, on the top of Mesa Yegua, at 7,500 feet (Bailey). [In Santa Fe County, where it is common, it nests up to 7,500 feet (Jensen, 1923).] At Fort Wingate, July 2-7, 1892, it was nesting at 7,000 feet (Fisher); Chloride Canyon, May 30, 1913, at 7,000 feet; 30 miles west of Chloride, June 5, 1913, 6,500 feet; [Chloride, June 14, 1917, at 6,200 feet; 18 miles northeast of Clouderoft, June 12, 1917, at about 7,000 feet (Ligon)]. From these altitudes it breeds down to Fort Bayard, 6,000 feet (Wilson); Silver City, 5,800 feet (Kellogg); Rio Felix, 5,500 feet (Ligon); Santa Rosa, 5,000 feet (Bailey); Dog Spring, 4,800 feet (Mearns); Deming, 4,300 feet, and Lordsburg, 4,200 feet. The breeding range extends east to Montoya (Bailey), and to Roswell (Ligon). The breeding season extends through May, June, and July. Eggs were found May 27, 1892, at Dog Spring in Grant County and also on June 17 of the same year in the neighboring San Luis Mountains (Mearns). Young were seen just from the nest the last of June, 1905, at Fort Wingate (Hollister); and a nest at Ribera, June 26, 1903 (Bailey); while eggs have been found as late as the first part of July at Silver City (Marsh).

During migration the species hardly goes higher in the mountains than the upper limit of the breeding range; migrants are most common during August and some are still present in September; the last was seen at Chloride September 8, 1915 (Ligon); they were fairly common September 15 and 16, 1902, in the Hondo Valley near the Capitan Mountains (Hollister); the last was seen at State College September 20, 1914 (Merrill); and several were seen September 21-22, 1908, at Ojo Caliente (Birdseye); seen along the Red River in Colfax County, September 24, 1913 (Kalmbach); a small flock near Santa Rosa to October 8, 1902 (Gaut); Mesilla October 12, 1913 (Merrill); and the last noted at Gila October 6-12, 1908 (Goldman).

In the spring, the returning migrants reached State College April 13, 1913 (Merrill); and Albuquerque April 14, 1901 (Birtwell). [One was seen April 19, 1919, at the G. O. S. Ranch about 35 miles northeast of Silver City (Ligon).]—W. W. COOKE.

NEST.—Bulky, of similar materials to that of *verticalis*, generally saddled well out on a horizontal branch of a cottonwood or other tree, 10 to 50 feet from the ground. Eggs: Usually 3 or 4, like those of *verticalis* but not quite so heavily spotted.

FOOD.—Mainly beetles, wild bees and wasps, stink bugs, moths, caterpillars, grasshoppers, crickets, dragon flies, and spiders, and also an unimportant amount of fruit.

GENERAL HABITS.—The Cassin Kingbird whose white chin, as it turns its head, contrasts sharply with its dark gray foreparts, has a narrow white tail band marked enough to suggest its relationship to the eastern kingbird.

A nest we found at Aguanigra in a nut pine was a mass of the highly prized wool, mixed with string borrowed from camp, looped around the branches and draped over the twigs.

At Mesilla Park, Professor Merrill found the Cassin less abundant than the Arkansas, and rather shy, nesting in seclusion in larger trees.

Except for a quieter manner, as he says, its habits are similar to those of the Arkansas, with whom it often shares the roadside telephone and telegraph wires.

At Lake Burford Doctor Wetmore found the Cassin frequenting "rocky hillsides, where scattered yellow pines rising above the low undergrowth, made convenient perches from which to watch for insects and look out over the valleys. The birds nested here in small numbers and males were seen at intervals in crazy zigzag sky dances made to the accompaniment of harsh calls and odd notes. . . . Toward dusk they called constantly, their harsh, stirring notes making a pleasing sound that mingled with the songs of Western House and Rock Wrens, the scolding of an occasional Mockingbird and the cheerful calls of the Robins" (1920a, p. 400).

When migrating, Mr. Aiken says, the Cassin is found in parks in the foothills, "alighting upon weed stalks and low bushes from which it sallies forth after insects" (in Henshaw, 1875, p. 344). On the Wheeler Survey, Mr. Henshaw found it on the sides of open brushy ravines and especially on the edges of sagebrush plains.

Both Cassin and Arkansas are accused of killing bees, but one of the Cassin taken within a few hundred feet of an apiary, as Professor Merrill testifies, had "not one bee in its gizzard, which was filled with small grasshoppers and moths" (MS).

In the Pecos Valley between Roswell and Fort Sumner, when Mr. Ligon visited it, he says there was "scarcely a tree on the river but contained a nest of this bird," which, perhaps from necessity rather than choice, selects some peculiar places for its nests. Like the Arkansas, one of its favorite sites is the 'V' of a milepost along the railway lines. Fifty miles north of Roswell, Mr. Ligon found a nest "in a windmill tower . . . set between the tower posts and against the revolving pipe just underneath the machinery, and where the mill was turning past it, sometimes on one side and sometimes on the other" (MS).

SCISSOR-TAILED FLYCATCHER: *Muscivora forficata* (Gmelin)

DESCRIPTION.—*Male*: Length about 12 to 15 inches, wing 4.4–5.1, tail 7 to 10 inches, wing with one quill deeply cut at tip. *Adult male*: Foreparts hoary ash, paler on throat, the crown with a small concealed patch of orange or scarlet; back and scapulars usually more or less suffused with *pinkish* or *salmon*; upper tail coverts blackish, edged with grayish; *tail deeply forked*, feathers of fork, white, usually *tinged with salmon pink and tipped with black*, middle feathers, black; wings dusky, with light edgings; *under wing coverts salmon, axillars scarlet; sides and flanks from salmon pink to blood red*. *Adult female*: Similar but crown patch wanting or obsolete, coloration usually duller, sometimes partly orange-buff, and fork of tail shorter. *Young*: Upperparts brownish gray, crown darker, concealed patch wanting; sides, flanks, belly, and under tail coverts uniform cream-buff, red axillar patch wanting.

RANGE.—Breeds from southern Kansas to southern Texas and southeastern New Mexico, casually from southwestern Missouri to western Louisiana; winters from southern Mexico to Panama. Accidental in Canada, and in a number of the United States.

STATE RECORDS.—The few records of the Scissor-tailed Flycatcher in New Mexico come from the southeastern part of the State. Its regular breeding range

extends west in Texas to Tascosa, Lubbock, and Pecos almost to the New Mexico line. One was seen at Carlsbad, August, 1910 (Dearborn); but apparently the species occurred only as a straggler in New Mexico until June, 1912, when it appeared and proceeded to breed at Hobbs, close to the Texas line and about 45 miles north of the southeastern corner of New Mexico. After that its numbers increased until the summer of 1915, when it was fairly common and ranged at least 10 miles into New Mexico. [In 1918 Ligon reported that it had been recorded as far north as Carlsbad and without a doubt nested about Malaga, a few miles south. On May 31, 1919, at an old deserted ranch on the Staked Plains, about 55 miles northeast of Carlsbad and probably about 18 miles west of the Texas line he found four of the birds, and one of them came to a small peach tree with material for her half-finished nest. On June 2, 1919, he saw a pair 2 miles northeast of Carlsbad where they were completing a nest in one of a row of cottonwoods. On June 20, 1919, Charles Bliss saw one 8 miles northeast of Carlsbad, and on June 21, another on a



From Handbook of Western Birds

Fig. 74. Scissor-tailed Flycatcher

wire fence on the Tatem road 12 miles north of Lovington.]—W. W. COOKE.

NEST.—Generally 5 to 15 feet from the ground, preferably in mesquite but also other trees and thorny bushes, in isolated huisaches on the prairie, in oak motts, in trees about houses, and sometimes on telegraph poles and light towers in a city; made usually of fine rootlets and plant stems lined with plant fibers, thistle down, wool, and feathers, but sometimes with green twigs, Indian tobacco, gray moss, cotton, sago, or seaweed. *Eggs:* Usually 5, white, boldly blotched with reddish and darker browns, and lilac shell spots.

FOOD.—In 128 stomachs examined, 96.12 per cent of the contents was animal food, practically all insects and spiders; and 3.88 per cent vegetable, chiefly small fruits and seeds. Of the animal food, less than 1 per cent belonged to useful families of insects, the rest being practically all harmful. Grasshoppers and crickets averaged 46.07 per cent. As the Scissor-tail feeds more on the ground than most flycatchers, beetles made up 13.74 per cent, including snout beetles, cotton boll weevils, and the 12-spotted cucumber beetle injurious to many vegetables. Bees, wasps, and ants made 12.81 per cent; bugs, 10.17 per cent, among them stink bugs and squash bugs; caterpillars, and a few moths made 4.61 per cent, including the cotton leaf worm and cotton boll worm or corn worm. While its consumption of grasshoppers

alone is sufficient to entitle it to protection, its destruction of insects especially injurious to vegetables, and in addition its habit of driving off hawks make it peculiarly valuable about houses (Beal).

GENERAL HABITS.—That the Scissor-tail, an astonishing creation with glistening black, white, and salmon plumage and white forked tail twice its length, has not only crossed from Texas—where it is known as the Texas Bird of Paradise—but is slowly spreading, mile by mile, into New Mexico is matter for special gratulation. Every one whose ranch or village is reached in this extension should constitute himself an especial guardian of this remarkable visitor, not only on the utilitarian ground that it eats the insects which threaten his vegetables and drives off the hawks which harry his chickens, but on the higher ground that it is the most spectacular, the drollest and most entertaining bird of the air whose good fortune it was ever man's to have in his neighborhood.

In effervescent spirit and original, fantastic, aerial evolution, it outdoes all its kin—this kingbird raised to the Nth degree. One of its favorite performances is to fly up and, with rattling wings and penetrating bee-bird screams—*ka-queé-ka-queé-ka-queé-ka-queé-ka-queé*—execute an aerial seesaw, a line of sharp-angled $\wedge\wedge\wedge\wedge\wedge\wedge$ s, at the angles rapidly opening and shutting its long white scissor-blades. Regarding the other fowls of the air, the male shows such arrogant assurance that he has actually been seen giving chase to the Mexican national emblem, the Caracara, pouncing upon the innocent passerby and literally riding him out of the neighborhood.

A more praiseworthy assertion of his rights was witnessed when the head of a family was guarding his mate on the nest and another Scissor-tail flew in as if to question those rights. "The angry guardian flew at him in fury, chasing him from the field with a loud noise of wings. At the first sound of combat the brooding bird's head appeared above the nest and hopping up on the rim she watched the chase with craned neck till the intruder, with her lord and master close at his heels, faded into white specks in the blue" (Bailey, 1902b, p. 30). Why such eager interest on the part of the onlooker? Was the well punished intruder perchance an old discarded lover?

Usually social in habit, a band of Scissor-tails may be seen at their evening ablutions, darting down to a pool for a dip, then flying up into the air, their beautiful pink, salmon, and ruby patches shining in the late afternoon light (Nice, 1924, p. 56).

ARIZONA CRESTED FLYCATCHER: *Myiárchus magister magister* Ridgway

DESCRIPTION.—*Length:* About 9.4–10 inches, wing 4–4.6, tail 4.1–4.6, *bill from nostril* .7–.8, *tarsus* .9–1. *Adults:* *Upperparts grayish olive*, browner on head, upper tail coverts, tail, and wings; tail with middle feathers dusky brown, others partly rufous; *outer tail feathers with uniform dusky streak on inner web*; wings brownish, middle and greater coverts edged with lighter, primaries edged with cinnamon-

rufous; throat and breast *light ash-gray*, rest of underparts *pale sulphur-yellow*. *Young*: Like adults but with more rufous on tail.

RANGE.—Southern Arizona and southwestern New Mexico south through western Mexico to Oaxaca and Chiapas.

STATE RECORDS.—The only sure record of the Arizona Crested Flycatcher in New Mexico is that of Frank Stephens, who took a specimen June 12, 1876, which is now in the Brewster collection (Brewster, 1882, p. 203). It was taken "on the Gila River about 40 miles from the Arizona line and 20 miles below old Fort West." Mearns took a specimen July 3, 1892, on Cajon Bonito Creek just over the line from the southwestern corner of New Mexico.—W. W. COOKE.

NEST.—In old woodpecker holes in giant cactus or other trees, lined with hair, and snake and lizard skin. *Eggs*: 3 to 5, dull clayey buff with numerous longitudinal lines and dashes of purplish brown or lavender.

GENERAL HABITS.—The Arizona, or Large-billed, Crested Flycatcher, which is the largest of the genus that comes into the United States, breeds mainly in the giant cactus belt. It frequents low mesquites and Mr. Stephens found it tame and rather noisy. Its food seems to be largely beetles.

ASH-THROATED FLYCATCHER: *Myiarchus cinerascens cinerascens* (Lawrence)

PLATE 42

DESCRIPTION.—*Length*: About 8-8.5 inches, wing 3.8-4.2, tail 3.6-4.2, bill from nostril .5-.6, tarsus .9. *Head slightly crested*, rictal bristles strongly developed. *Adults*: *Upperparts grayish brown*, darker on head; tail with middle feathers dusky brown, the rest chiefly *cinnamon-rufous on inner webs*; outer tail feather with *inner web dusky at tip*, *outer web distinctly whitish*; wings with middle and greater coverts broadly tipped with lighter; *primaries edged with cinnamon-rufous*; *throat and chest pale ashy*, *belly pale sulphur-yellow*. *Young*: Similar to adults but tail feathers rufous with dark median stripe, wing markings partly buffy, and underparts yellowish white.

COMPARISONS.—Of the three flycatchers of the genus *Myiarchus* found in New Mexico, the Arizona Crested is the largest in body and bill, but has only one record for the State (on the Gila); the Ash-throated is the medium-sized one of the three and is the abundant breeding bird of the State; while the Olivaceous is the smallest, being about the size of the Phoebe, with, so far, only two records, in the extreme southwestern part of the State. The Olivaceous can be distinguished by its small size, olive color, and usually, by the absence of tail markings. The Arizona Crested and the Ash-throated may be distinguished by the markings on the outer tail feather which, in the Ash-throated, has only a *dusky tip*; in the Arizona Crested, a *wide dusky streak along the inner web*. (See pp. 423, 427.)

RANGE.—Breeds from southern Washington, northern Utah, central Colorado, and central Texas to Tamaulipas, Durango, Sinaloa, and northern Lower California; winters south to Guatemala and Yucatan. Recorded from northwestern Montana in September.

STATE RECORDS.—The Ash-throated Flycatcher is an abundant breeder throughout the lower parts of New Mexico, from the San Luis Mountains (Mearns); and the Guadalupe Mountains (Fuertes); north to Shiprock (Gilman); and Rinconada (Surber); east to Montoya (Bailey); and the Capitan Mountains (Gaut). It breeds



From Handbook of Birds of the Western United States

ASH-THROATED FLYCATCHER

On one of his favorite perches, a desert willow whose light yellow flowers go well with the pale sulphur-yellow of his lower underparts

from as low as 4,200 feet at Lordsburg (Bailey); to 7,000 feet in the Pinos Altos Mountains (Fisher); the same altitude at Fort Wingate (Hollister); to 7,400 feet on the top of Mesa Yegua, and to 7,500 feet at Glorieta (Bailey). Young just able to fly were noted July 2, 1894, at Silver City (Fisher); and young barely grown August 9,



MAP 26. ASH-THROATED FLYCATCHER

Triangles mark breeding and breeding season records, mainly in Upper Sonoran Zone

1901, in the Guadalupe Mountains (Bailey). [Fifty miles north of Roswell a nest with young was found, June 21, 1918 (Ligon). A specimen was taken at Silver City, May 14, 1917 (Kellogg); and one was seen at Lake Burford, May 26, 1918 (Wetmore).]

None remain in the State during the winter, and the latest one seen at Beaver Lake was on August 26, 1908 (Birdseye). It is probable that a few remain as late as the first of September.

In the spring, the first was taken April 1, 1892, on the southern New Mexico boundary line 60 miles west of the Rio Grande (Mearns). This was probably un-

usually early, but one was taken in Grant County, April 15, 1886 (Anthony); and others were taken April 16. In 1886, the first did not come to Apache until April 14 (Anthony). In 1890 the first arrived at Carlisle April 16 (Barrell).—W. W. COOKE.

NEST.—Rarely above 20 feet from the ground, in knot holes of various trees, cavities of old stumps, woodpecker holes, and occasionally behind loose pieces of bark. When a large cavity is used, the bottom is filled with weed stems, rootlets, grass, and bits of dry manure, on which the nest proper is built—a felted mass of hair and fur (in one case burro hair and duck feathers) and occasionally skins of snakes and small lizards. *Eggs*: 3 to 6, from light cream to pinkish buff, with fine longitudinal streaks of purple, rarely with large irregular blotches.

FOOD.—Mainly wild bees and wasps, bugs, including buffalo tree hoppers, stink bugs, cicadas, jumping plant lice, leaf hoppers, flies, caterpillars, moths, grasshoppers, crickets, dragon flies, and spiders. "In its animal food the Ash-throat destroys a great number of harmful insects and a few beneficial ones, so that the balance is greatly in the bird's favor. Its vegetable food [wild berries and seeds] has absolutely no economic interest" (Beal). Five taken near an apiary contained no honey bees, but one contained 24 robber flies, an enemy of the honey bee.

GENERAL HABITS.—The long thin body and big head and crest of the Ash-throated Flycatcher place it in the desert landscape when too far away for the recognition of its sulphur-yellow belly and rufous wing quills.

Two of the birds which we saw at Lordsburg, June 2, 1907, on the creosote desert were flying about a disused windmill, apparently attracted by a swarm of winged ants. When disturbed the pair flew off toward the hills.

Early in summer, Professor Merrill writes, the Ash-throated is rare in the valley near Mesilla Park but common in the mountains. Later, he says, "it is seen oftener in the valley, among the tornillos. In the mountains it is found oftenest near water, sitting quietly on a low-hanging limb, diligently and noiselessly taking insects" (MS).

Near Tucson, Major Bendire found that the favorite haunts of these Flycatchers were the denser mesquite thickets in the creek bottoms, oak groves along hillsides, and the shrubbery of canyons; but they were occasionally seen on the more open plains covered with straggling mesquite and patches of cactus. Two pairs were seen by the Major using abandoned Cactus Wrens' nests (1895, p. 267), and others were discovered by Mr. Anthony nesting in the dry blossom stalks of the yucca and agave in New Mexico (in Bendire, 1895, p. 267).

A peculiar nesting site was found by Mr. Ligon at the old Miller ranch on the Pecos—a four-inch exhaust pipe six feet long standing at an angle of about thirty degrees, coming from the cylinder of an abandoned oil engine. The pipe was smeared inside with the black fuel oil softened by the heat and the parent bird which flew from the nest, that was about twelve inches down inside the pipe, to a mesquite on a bank above, was so black that Mr. Ligon had difficulty in recognizing it (MS).

At one of our camps near Santa Rosa, where the Ash-throats were

frequently heard giving their loud calls, a pair were busy house hunting. They appeared to be greatly taken by a hole in a juniper that was unfortunately only two or three inches deep. Again and again, they came back to it, putting in their heads and necks, apparently unable to accept the fact that they could go in no farther.

In the neighborhood of Santa Fe, Mr. Jensen has found a few pairs nesting in Bluebird boxes on pinyon pines. He has known of several nests being destroyed by pack-rats and chipmunks.

ADDITIONAL LITERATURE.—GILLESPIE, J. A., *Bird-Lore*, XXVI, 237-238, 1924 (rewards of bird banding).

OLIVACEOUS FLYCATCHER: *Myiárchus láwrencei oliváscens* Ridgway

DESCRIPTION.—*Length: 7-7.3 inches, wing 2.9-3.2, tail 3-3.2, bill from nostril .4-.5, tarsus .7. Adults: Head and back grayish olive, tail usually without cinnamon-rufous edgings, wings with only pale cinnamon on inner primaries; throat and breast ash-gray in sharp contrast to primrose-yellow of rest of underparts. Young: Upperparts brown, underparts paler, wings and tail feathers with rusty edgings.*

RANGE.—Upper Sonoran Zone in mountains of southern Arizona and southwestern New Mexico south through western Mexico to Oaxaca. Recorded from Colorado.

STATE RECORDS.—During the Mexican Boundary Survey, two specimens of the Olivaceous Flycatcher were taken July 13 and 17, 1892, in the San Luis Mountains (Mearns). Two others had been taken the earlier part of the month just south of the line, so it is evidently a regular summer visitant to extreme southwestern New Mexico, as it is to the neighboring parts of Arizona. These are the only records for the State.—W. W. COOKE.

NEST.—In natural cavities or old woodpecker holes, 20-50 feet from the ground; made, in two recorded cases, of rabbit fur and feathers. *Eggs:* Similar to those of the Ash-throated Flycatcher but smaller, with finer markings.

GENERAL HABITS.—Scarcely larger than the Phoebe, the well-named little Olivaceous Flycatcher, which Mr. Swarth found in the Huachuca Mountains, might easily be overlooked except for its mournful, long-drawn note. As Mr. Swarth says, "Seldom venturing into open ground, it loves the dense, impenetrable scrub oak thickets of the hillsides better than any other place, though also found along the canyon streams wherever the trees grow thick enough to prevent the sun from penetrating" (1904, pp. 22-23).

ADDITIONAL LITERATURE.—BENDIRE, CHARLES, *Life Histories of North American Birds*, 270-271, 1895.—HOWARD, O. W., *Bull. Cooper Orn. Club*, I, 104-105, 1899.

SULPHUR-BELLIED FLYCATCHER: *Myiodynástes luteivéntris* Selater

DESCRIPTION.—*Length: About 7.7-8 inches, wing 4.2-4.6, tail 3.3-3.6, bill .8-.9. Bill very broad. Adults: Upperparts strikingly streaked with black, ground color mainly olive or brown; crown with large concealed bright yellow patch, upper tail coverts and tail extensively rufous, the middle tail feathers with broad dusky stripe; wings dusky, feathers largely edged with lighter, wing bars yellowish, wing linings and underparts sulphur-yellow, heavily streaked with black except on middle*

of belly. *Young*: Similar but crown patch restricted, upperparts more brownish buffy, wing bars cinnamon-buff.

RANGE.—Mountains of southeastern Arizona and southwestern New Mexico south to Panama; winters south of United States.

STATE RECORDS.—The Sulphur-bellied Flycatcher has not yet been captured within the limits of New Mexico, but it is a regular breeder in the mountains of southeastern Arizona and was taken July 3, 1892, on Cajon Bonito Creek just over the line in Mexico from the southwestern corner of New Mexico. It has been reported by Lieut. Col. E. P. Rockhill as seen on the upper reaches of the Gila River in April, 1915, and afterwards on the lower Mimbres above Deming, so that it will undoubtedly be taken within the State.—W. W. COOKE.

NEST.—In a natural cavity of a sycamore (as far as reported) lined with walnut leaves. *Eggs*: 3, creamy buff, profusely blotched, chiefly around the larger end, with purple and reddish brown.

GENERAL HABITS.—The strikingly striped, rufous-tailed, Sulphur-bellied Flycatcher in the Huachuca Mountains, as Mr. Swarth found, is "preeminently a bird of the heavily wooded canyons . . . seen only along the streams . . . between 5,000 and 7,500 feet altitude" (1904, p. 22). As it frequents the tops of the tallest trees, where a far brighter bird might easily escape observation, and its colors blend exceedingly well with the surrounding vegetation, it is by no means easy to see, especially as it often sits perfectly motionless long at a time.

PHOEBE: *Sayornis phoébe* (Latham)

DESCRIPTION.—*Length*: About 6.2–7 inches, wing 3.2–3.5, tail 3–3.4. *Adults in spring* (January to April inclusive): *Head sooty brown in contrast to grayish olive back*, rump, and upper tail coverts; tail and wings dusky, with lighter edgings, tail with outer feathers edged with whitish; chin grayish, *underparts dull yellowish white*, sides of breast grayish olive. *Adults in fall and winter* (September to December inclusive): Similar to spring adults but yellowish white of underparts replaced by primrose-yellow, back more decidedly olive, and wing-edgings more yellowish. *Young*: Similar to adults, but upperparts browner, wings crossed by two conspicuous cinnamon-brown or buffy bands, and upper tail coverts tinged with cinnamon.

RANGE.—Breeds from southwestern Mackenzie, Alberta, southern Keewatin, Ontario, Quebec, Nova Scotia, and Prince Edward Island south to highlands of Georgia, northern Mississippi, central Texas, and northeastern New Mexico; winters in United States south of latitude 37° and south to Vera Cruz and Oaxaca; casual to California, Colorado, and Wyoming.

STATE RECORDS.—The first and only record of the Phoebe for New Mexico is that of several pairs found nesting at Santa Rosa and its immediate neighborhood, May 29 to June 2, 1903 (Bailey). On the earlier date, young were being fed in the nest. This is apparently an isolated breeding colony that had become localized here nearly 300 miles west of the regular range.—W. W. COOKE.

NEST.—Under bridges and culverts, about houses and other buildings, in quarries, open wells, and caves, or on cliffs, rocks or shelves. If attached to a vertical surface, semicircular; made of mud pellets, mixed with moss, and a little grass and feathers; if on a flat beam or rafter, circular; with little or no mud. *Eggs*: Usually 5, generally pure white.

GENERAL HABITS.—The Phoebe, the familiar piazza builder of the east, as I have previously said, is "hardly a bird that one would look for in the arid plains region of New Mexico, but in the canyons breaking down from the plains to the Pecos River exist conditions that are far from those of arid plains. Near Santa Rosa, from our juniper and cactus covered camp ground, we climbed down into one of these box canyons that boasted numerous water pools, fresh green cottonwoods, willows, woodbine, grapevines, and one patch of cat-tails, in which a warbler that we took for a female Yellow-throat hid away at our approach. Here, in a niche of rock over a water pool, we found a pair of Phoebes feeding young in the nest on May 29, and the brooding bird was so tame that she let us photograph her at a distance of ten feet, so that her light chin shows to advantage. Her mate meanwhile called *phoe-be* from a tree near by, dishing his tail and sweeping out after insects as if in New England.

"Other Phoebes were seen about the same time in the vicinity. One, which was apparently catching insects for its young, was seen around one of the deep pools on the outskirts of Santa Rosa. The conditions in these places are so favorable that it would indeed seem strange if wanderers through the region were not occasionally tempted to stop" (1904c, pp. 392-393).

SAY PHOEBE: *Sayornis sayus* (Bonaparte)

PLATE 62

DESCRIPTION.—*Length*: 7.5-8 inches, wing 3.9-4.2, tail 3.3-3.7. Bill narrow, rictal bristles moderate. *Adults*: Upperparts plain brownish gray, crown and hind-neck darker, upper tail coverts dark gray, usually margined with paler; *tail brownish black*, outside feathers more or less distinctly edged with whitish; wings brownish gray with pale edgings; *throat, chest, and sides of breast buffy brownish gray*, median part of chest more strongly tinged with buff; *rest of underparts cinnamon-buff*. *Young*: Similar to adults, but upperparts browner, and wings with two buffy or brownish bands.

RANGE.—Breeds from central Alaska, northwestern Mackenzie, northeastern Alberta, southeastern Saskatchewan, and central North Dakota south to western Kansas, southern New Mexico, Arizona, and Lower California; winters from central California, southern Arizona, southern New Mexico, and central Texas south to Vera Cruz, Puebla, and Lower California.

STATE RECORDS.—Few birds of New Mexico are more common and widely distributed than the Say Phoebe. [Common all over the State in open country, especially in the Pecos Valley (1924), up to 7,000 feet (Ligon, 1916); in northern Santa Fe County up to 7,500 feet (Jensen, 1923); and in the Sangre de Cristos around habitations in the canyons to about 7,600 feet (Ligon, 1919).] It has taken kindly to the presence of man and is found in the towns and cities to a much greater extent than its eastern representative, the common Phoebe. At the same time it also nests out in the desert far from any human habitation. It breeds from 3,800 feet, Mesilla (Merrill); 4,000 feet at Fort Thorn (Henry); [4,000 feet in the vicinity of Carlsbad (Ligon, 1916)]; 4,200 feet at Deming and Lordsburg (Bailey); [6,200 feet at Chloride, May 14, 1916; 7,000 feet, Valley Ranch on Pecos River, July 9, 1919 (Ligon)]; up to 8,000 feet at Agua Fria Spring in the Zuni Mountains (Hollister); and to the same altitude in Hondo Canyon and at Questa. It has

been seen during the breeding season even as high as 9,000 feet at Cloudercroft and may occasionally nest at that altitude. In the fall it sometimes ranges much higher and one was seen August 14, 1903, on Pecos Baldy at 12,000 feet (Bailey). The nesting season is greatly extended and eggs have been reported from late March, 1885, at Silver City (Marsh); (May 6, 1920, at Silver City (Ligon); four eggs June 9, 1918, at Lake Burford (Wetmore)); two eggs which hatched July 23, 1905, at



Photograph by H. W. Nash

FIG. 75. Nest and Eggs of the Say Phoebe

A characteristic, big, loosely built Phoebe nest in a protecting niche of rock, with its full clutch of white eggs

Agua Fria Spring (Hollister); late April to early May being the usual date for the first set of eggs. A queer nesting habit is reported by Anthony. He found the species a common breeder in 1886, at Apache, where it arrived in March and nested quite early. About June 1, the birds began to leave and none were seen after June 16, until they returned in the fall migration on August 30. Apparently they had gone to a more northern locality or more likely to a higher altitude for the second brood.

In the fall migration many leave the State in September; [many were seen September 5 and 6, 1917, southwest of Magdalena (Ligon)]; but they were found common near Koehler Junction, from July 28 to October 1, 1913 (Kalmbach); and those seen at Lake Burford October 3, 1904 (Bailey), and at Espanola October 17, 1904 (Gaut), also probably represent late migrants in the northern part of the State.

In the southern part, they stay much later and were still common at Las Cruces in 1909, even to November 28 (Goldman).

In winter the species has once stayed at Fort Thorn (Henry); it is a regular winter resident at Mesilla (Merrill); and was fairly common at Silver City the winter of 1885-86 (Marsh). [On the Rio Grande Bird Reserve (Elephant Butte), it was noted November 23 to December 9, 1916, and on the Carlsbad Bird Reserve was rather common in December, 1916 (Willett).] It occasionally winters still farther north, since it was noted at Albuquerque January 29, 1900 (Birtwell). [It wintered in Albuquerque, 1918-19] and was found at the southern end of the San Mateo Mountains, December 7 to 10, 1915 (Ligon).

Early spring migrants sometimes appear in southern New Mexico in February, but usually the migration begins about the middle of March, and by the latter part of the month the birds have reached the northern part of the State. One was noted at Fort Wingate, March 11, 1887 (Shufeldt); and one at Albuquerque March 3, 1901 (Birtwell).—W. W. COOKE.

NEST.—Under bridges, about houses and barns, on windmills, in wells, caves, old tunnels, abandoned mine shafts, under shelves of rock, and also in a pocket in the steep bank of an arroya; made of weed stems, dry grasses, moss, plant fibers, wool, cocoons, spider webs, and hair, lined with wool or hair; sometimes with the addition of mud. *Eggs*: Usually 4 or 5, white, sometimes with a few specks of reddish brown around the larger end.

FOOD.—Insects, 99.78 per cent. Useful beetles, 5.95 per cent, neutral or harmful beetles, 9.72 per cent; hymenoptera, mainly wasps and wild bees (no honey bees), 30.72 per cent; flies, mostly of the families of the house fly, crane fly, and robber fly, 16.67 per cent; grasshoppers and crickets, 15.36 per cent—in Colfax County, July 28–October 24, grasshoppers 37 per cent (Kalmbach)—caterpillars and moths, 12.12 per cent; and a small amount of bugs, dragon flies, spiders, millipeds, and sow bugs. While more predatory beetles are eaten than by any other flycatcher, the per cent is so small compared with the injurious insects eaten that it deserves protection.

GENERAL HABITS.—The brown-bellied, black-tailed Say Phoebe, like the eastern Phoebe is fond of nesting about houses, becoming attached to its chosen nesting site and often returning year after year—perhaps to the same piazza crotch. At Mesilla, where the Say ranks next to the Arkansas in numbers, Professor Merrill had a pair nest on his piazza for a term of years, usually rearing two broods, the first being out by the first of May, the second not until July. That crowds and noise do not disturb the friendly birds is shown by a nest over the main entrance of a High School, and one that we found at Deming, on a piazza of the depot hotel over the tracks of the Santa Fe Railroad. More conservative members of the family, however, keep to the ways of their forbears, nesting far from the habitations of man. A curious nest found by Mr. Munro in British Columbia, made largely of dry lace-like pondweed that had been washed up on a beach and bleached white by the sun, was placed inside a vacant tent, on a wooden cross-support, near the door (1919b, p. 71).

At Santa Rosa, we found four nests containing young. All were on ledges near water holes, except one in a dry well on high plains far from

water, in which the young were being fed from May 26 to June 6. On a branch of the Concho, a nest lined with wool and containing eggs was found on a boulder, May 26; and at Montoya, another, in a cut bank, lined with wool, contained three eggs on June 19, perhaps a second nest of the year. A nest found by Doctor Wetmore at Lake Burford was safely placed in a deep narrow arroyo on a shelf three feet from the bottom, where the overhanging bank concealed it from view. It was made of a few bits of weed stems and rootlets bound together by spider webbing and felted with a mass of sheep's wool gathered from the surrounding sagebrush. Occasionally he saw the birds "hovering over open flats in much the same manner as the Mountain Bluebird" (1920a, p. 401).

Although the usual call note of the Say Phoebe is a plaintive *phce-eur*, during the nesting season it has a short twittering warble, used, Professor Merrill says, whenever a pair meet, flying or at home, and after courtship while brooding and raising the young. As late as November we heard one delivering a sustained series of notes, a praiseworthy belated effort, if not a highly musical performance.

Near Fort Wingate in July, Mr. Henshaw found the Say Phoebe for the most part on open sagebrush plains or on open and rocky hillsides scantily clothed with brush and a few scattered pinyon trees (1875, p. 349). In migration, Doctor Heermann wrote, "it prefers the deep valleys bordered by high hills, but is found also on the open plains, where, perched on the stalk of some dead weed or on a prominent rock, it darts forth in pursuit of its prey, to return again to its point of observation" (1859, p. 37).

At the Carlsbad Cave this Phoebe is called "the Cave Bird," for, to cite the memory of the oldest inhabitant, it has nested for some twenty years down in the natural shaft of the great cave. Smaller neighboring caves also have their nests. Before the nesting season, in March and April, 1924, Mr. Bailey found that a pair of the birds regularly entered the shaft of the main cave at night for the shelter of a warm roost safe from outside enemies. The great numbers of moths and other insects, which also took advantage of the warm shaft, were doubtless an added attraction.

Though some of the Say Phoebes winter in New Mexico, the nature of the food of these useful birds, which Professor Merrill well denominates "efficient fly and diurnal moth traps," necessitates their departure when the insects have gone; but a flock that Mr. Ligon happened on at San Acacia, January 12, 1919, was making a brave stand, actually sitting on ice catching insects where, except for a few airholes, the water was covered with a solid layer several inches thick. As much of its insect food contains hard indigestible parts, the Phoebe, like the hawks,

owls, kingfishers, many of the flycatchers, and various other birds, ejects them in the form of pellets.

ADDITIONAL LITERATURE.—HENDERSON, H. N., *Bird-Lore*, XXVI, 89-94, 1924 (nesting).—SETON, E. T., *Bird-Lore*, XXIII, 286-287, 1921 (birds that signal with tails).—WARREN, E. R., *Condor*, XXI, 62-65, 1919 (bird notes in stormy May).

BLACK PHOEBE: *Sayornis nigricans semiátra* (Vigors)

PLATE 43

DESCRIPTION.—*Length:* About 6.2-7 inches, wing 3.5-3.8, tail 3.4-3.7. *Adults:* *Sooty slate* (blackish on head and breast, brownish on back, scapulars, rump, and upper tail coverts), with white outer web of outer tail feather, brownish gray wing edgings, *abruptly white belly, and white under tail coverts streaked with dusky.* *Young:* Similar to adults but more sooty, wings and feathers of posterior upperparts tipped with brownish; bordering white of underparts suffused with brown or rusty.

RANGE.—Upper and Lower Sonoran Zones from California and Arizona to southern New Mexico and central Texas, south over Mexico (except Gulf coast) to Yucatan.

STATE RECORDS.—Coming into southwestern New Mexico, the Black Phoebe [is fairly commonly distributed, along the water-courses breeding from about 3,500 to 6,500 feet (Kellogg)]. It breeds to 6,500 feet on the Mimbres (Bailey); to Redrock on the Gila (Goldman); [a male taken at Redrock on March 25, 1928, was about to breed (Kellogg)]; it was common west of the Rio Grande as far north as Chloride and up all the tributaries of the Gila to 6,500 feet (Ligon, 1916-1918); and to Cooney on the San Francisco River (Barrell). A nest with eggs was found May 18, 1913, near Chloride at 6,300 feet; two days later a nest with young at about the same altitude on the East Gila River. [May 14, 1916, fresh eggs were found at Chloride, 6,300 feet, and May 25, 1916, young in the nest on Cuchillo Creek at about 5,400 feet;] and another nest found May 21, at 6,600 feet on Taylor Creek (Ligon). A pair nested at Mesilla in 1913—the first time the species had been seen at that locality (Merrill)—and it was once taken at Fort Thorn (Henry). It is reported from Silver City (Kellogg).

After the breeding season, two specimens were taken August 8, 1904, at Kingston (Metcalf); and the last were seen at Chloride, September 12, 1915 (Ligon), and at Redrock about October 3, 1908 (Goldman).

While the majority of the Black Phoebes of the United States migrate into Mexico in October and return early in March, a good many winter in the United States even in localities where snow occasionally falls, and on the Carlsbad Bird Reserve the species was seen several times during January, 1915, and noted during the winter of 1915-16 (Willett). [One seen January 1, 1920, at the Avalon Dam, 5 miles north of Carlsbad, at 3,200 feet, was said to have been there all winter (Ligon).] At Cieneguilla, at 6,000 feet, in a canyon and cave country, between February 10 and April 10, 1904, it was sometimes common (Surber).

In the spring, at Silver City it was seen in March and April (Hunn); at Cooney March 2, 1889; [on Chloride Creek, 6,300 to 6,500 feet, March 27, 1920 (Ligon),] and at Carlisle, March 9, 1890 (Barrell).—W. W. COOKE.

NEST.—A wall pocket made of small pellets of mud mixed with bits of dry grass, weeds, moss, or hair, lined with rootlets, strips of bark, vegetable fibers, hair, wool, and occasionally feathers, placed in wells and on the sides of buildings and cliffs. *Eggs:* 3 to 6, white, sometimes dotted with reddish brown around the larger end.

FOOD.—Almost wholly animal—99.41 per cent; of this useful beetles made up 2.82 per cent, harmful or neutral beetles, 10.50 per cent; hymenoptera, mainly wild

bees and wasps. 30.82 per cent for the year, 58.75 per cent for August; flies, 28.26 per cent, proved the most regular article of diet, with 64.36 per cent in April, proving its right to the name of flycatcher; ants made a notable part of the food in mid-summer. Bugs constituted 10.56 per cent. Moths and caterpillars amounted to 8.22 per cent. It should be rigidly protected and in every way encouraged (Beal, 1912).

GENERAL HABITS.—The handsome black and white Phoebe is one of the few strikingly marked flycatchers, and its gentle voice adds to its attractiveness. As it sits—perhaps on a fence wire—its tail jetting and its wings quivering ready for instant action, at sight of a passing insect it darts out with a liquid *hip'*, a rising *kee-ree'* and falling *kee-wray'*, snaps up its prey, and circles back to its perch.

Like the other phoebes, it often nests about houses, where, with mutual benefit, it can indulge its fondness for house flies. In Lower California, Mr. Anthony found it from latitude 28° northward, wherever water was found, "building under the eaves of adobe houses when near human habitations, and on the sides of ledges along streams in the unsettled parts" (in Bendire, 1895, p. 280). In the desert, it has been found at a water hole, perhaps discovered in passing. In the mountains, Mr. Ligon has found it nesting mostly in deep narrow canyons near running water.

In southern Arizona, although the Black Phoebe was considered a permanent resident, Mr. Swarth found it locally migratory, "moving up into the hills in summer (to about 6,000 feet), and down to the lower valleys during the winter months" (1914, p. 41).

Along the Mimbres, where Mr. Bailey found the Black Phoebe up to his camp at 6,500 feet, he wrote: "One pair have a nest under our shed roof, another pair on a rock over the water just below our camp. The nest under our roof is made largely of mud lined with feathers and grass, the one on the rocks below is mainly of grass and fibers with less mud in its walls. There are young in both nests and the old birds bring great numbers of caddice flies to them. After dark when the old bird is on the nest and any noise disturbs her she snaps her bill in a vicious way well calculated to frighten away an enemy. The call note, evening and morning, is very plaintive and beautiful, almost a song" (MS).

ADDITIONAL LITERATURE.—JEWETT, F. B., Bull. Cooper Orn. Club, 13, 1899 (nesting).—SCOTT, C. de W., Educational Leaflet 114, Nat. Assoc. Audubon Soc.

WESTERN FLYCATCHER: *Empidonax difficilis difficilis* Baird

DESCRIPTION.—*Male:* Wing 2.5–2.9, tail 2.3–2.6, bill .6, width at base .2–.3, tarsus .6–.7; *outside primary shorter than fifth.* *Adults:* Upperparts brownish or grayish olive, tail grayish brown with lighter edgings; wings dusky, with two olive or buffy bars; axillars and under wing coverts pale yellow; broad orbital ring and lores yellowish or whitish, chest and sides pale buffy olive, rest of underparts pale yellow; bill with under mandible yellowish. *Young:* Similar to adults but upperparts browner, wing bars buffy or ochraceous, underparts paler.



From Biological Survey.

BLACK PHOEBE

The handsome member of the Phoebe family

COMPARISONS.—Of the six small *Empidonax*es found in New Mexico, the *Buff-breasted* can easily be recognized in the field by its buffy underparts. The other five are so much alike, with upperparts of dull olive, brownish, or grayish, pale wing bars, and underparts of pale yellowish or whitish, that they can be safely identified only by measurements and comparison of skins. Notes, habits, and favorable habitats however, may give a clue to their identity. The yellow-bellied *Western* is common in the higher ranges in spruce, fir, and aspen; the brown and white *Traill* largely in willow thickets and mountain meadows; the narrow billed, dark chested *Hammond*—only a migrant in the State—is found along canyons and among pines; the similarly marked *Wright*, with wider bill and white outer tail feather, nests from 7,000–9,000 feet; the rare, grayer *Gray* has been found only twice in the State. (See pp. 437, 438, 440).

RANGE.—Breeds from Glacier Bay, Alaska, coast of British Columbia, western Montana, and southwestern South Dakota, south to western Texas, Arizona, and southern California; winters in Mexico south to Cape San Lucas, Tres Marias Islands, and Oaxaca.

STATE RECORDS.—The breeding range of the Western Flycatcher extends from about 7,000 feet at Fort Wingate (Hollister) and the Animas Mountains (Goldman) to 11,500 feet on the Taos Mountains above Twining (Bailey). [It was common in all the higher ranges, in spruce, fir, and aspen and very common in the Black Range, from 7,000 to 8,800 feet (Ligon, 1916–1918)]; it extends east to the Capitan Mountains (Gaut); and to the Guadalupe Mountains (Bailey). Both in 1903 on the upper Pecos and in 1904 in the Taos Mountains the young were found just out of the nest August 5–7 (Bailey); while young at the same stage of growth were found at 8,600 feet in the Zuni Mountains August 15, 1911 (Dearborn).

In the fall, the species remains to early September in northern New Mexico and to the middle of the month in the southern part of the State.

On the return in the spring, the first one seen in 1886 at Apache, was on May 21 (Anthony); though it probably arrives on the average a few days earlier, and it was taken May 28, 1900, at Willis (Birtwell).—W. W. COOKE.

NEST.—Usually not far from water, in trees, stumps, upturned roots, under banks, on rock ledges, in natural cavities or about buildings; made of plant stems and fibers, down, inner bark, rootlets, leaves, and green moss, lined with horsehair and feathers, often coated with green moss, lichen, and spider web. *Eggs*: 3 to 5, white, blotched and spotted with brown and buffy pink.

FOOD.—Animal matter, 99.31 per cent, including useful beetles 2.45 per cent; other beetles, including the nut destroyer and other harmful species, 5.94 per cent; hymenoptera, 38.76 per cent, mostly bees and wasps, but also ants; flies, 31.22 per cent; bugs, 8.44 per cent, including stink-bugs, and leaf and tree hoppers; moths and caterpillars, 6.59 per cent, including the codling moth larvae.

GENERAL HABITS.—In the forests, the little Western Flycatcher is more often heard than seen, its soft *whee-ee* or its sharp alarm note notifying you of its presence when its dull olivaceous back and dingy yellowish underparts are lost in the greenery of the tree tops. From the bird's northern breeding grounds in Alaska, Alfred M. Bailey wrote, "I do not know of a more pleasing sound than their quiet call coming through the great woods, mysteriously as though from nowhere." In the breeding season, as Mr. Henshaw says, *difficilis* is "most often found in narrow canyons and deep shady glens . . . almost invariably near a stream or among trees that border the open meadowy tracts" (1875, p.

359). But with the settlement of the country, it is also found foraging in orchards, greatly to the benefit of the orchardist.

Its call was one of the common sounds we heard in the Taos Mountains, from 7,400–11,500 feet. It was also heard in the Wheeler's Peak amphitheater, and the high willows above Twining, on August 5, 1904,



MAP 27. WESTERN FLYCATCHER

Shaded areas show breeding range, mainly in Canadian and Transition Zones

when we found a family of young being fed out of the nest. At 11,000 feet on Pecos Baldy, August 5, 1903, Mr. Bailey found a nest containing four young. It was in the earth-laden, upturned root of a tree, about four feet from the ground, in a cavity of convenient size. On August 7 the young had flown and the nest being examined proved to be double—apparently two nests—made of rootlets, grass stems, and green moss mixed in all the way through, the lining being of fine grass.

A number of birds were seen in the Jemez Mountains and an adult and immature were collected, August 24, 1906, near Santa Clara Creek at about 8,000 feet. Neither birds showed signs of molt, though the feathers of the adult were much abraded. Other families were seen or heard up to about 8,500 feet. So, as it appears, the quiet-voiced birds are pleasantly associated with the best of the timbered mountain country in New Mexico.

ADDITIONAL LITERATURE.—BAILEY, F. M., Condor, VIII, 108, 1906 (nest).—MYERS, H. W., Condor, XIII, 87-89, 1911 (nesting habits).

LITTLE TRAILL FLYCATCHER: *Empidonax trailli brewsteri* Oberholser

DESCRIPTION.—*Male*: Wing 2.7-2.8 inches, tail 2.2-2.3, bill .5, tarsus .6-.7. Female slightly smaller. *Adults*: Crown brownish olive, centers of feathers olive-brown; rest of upperparts olive-brown, more olive on upper tail coverts; tail and wings dark brown, tail with basal portions margined externally with brownish olive; wing with brownish edgings; lores yellowish white; underparts white, shaded with gray on breast, tinged with yellow below.

COMPARISONS.—The wide bill, brownish instead of green upperparts, and whitish underparts, are distinctive.

RANGE.—Breeds from southwestern British Columbia and Idaho south to central Texas, New Mexico, Durango, northern Sonora, and northern Lower California; winters in Central America south to Nicaragua and Colombia.

STATE RECORDS.—Either the Little Traill Flycatcher is rare in New Mexico or else it has been overlooked by most observers and collectors, for there are only a few records of its occurrence in the State. These few records come from the lower parts where it was taken June 1, 1904, at Rinconada (Surber); near Santa Rosa, May 26, 1903 (Bailey); and at Fort Bayard, July 27, 1897 (Fisher). It was probably breeding not far distant from these places and has been reported as a summer resident at Cooney and Carlisle (Barrell).

In the fall migration it was found a little higher to 6,500 feet in the Magdalena Mountains, August 30, 1909 (Goldman); and was present at Apache from July 30 to September 6, 1886 (Anthony).

In the spring, the first were seen at Cooney, May 10, 1889 (Barrell).—W. W. COOKE.

NEST.—In low bushes near water, made of dry grasses, pine needles, shreds of bark, and plant fibers, lined with fibers, bark, grass tops, fern down, and horse hair. *Eggs*: 2 to 4, white or pinkish buff, with dots or blotches of brown; mostly about the larger end.

GENERAL HABITS.—The Little Traill Flycatcher is found in willow thickets, beaver meadows, and the borders of mountain parks, where its whitish underparts and brownish upperparts, its quick nervous movements, and its frequently repeated *whit*, help to identify it.

HAMMOND FLYCATCHER: *Empidonax hammondi* (Xantus)

DESCRIPTION.—*Male*: Length about 5.5-5.7 inches, wing 2.6-2.8, tail 2.3-2.5, bill .5-.6, width at base .2, tarsus .6-.7. *Female*: Length about 5.2 inches, wing 2.4-2.7, tail 2.1-2.4. Bill very small and narrow, under mandible usually blackish; first (outside) primary longer than fifth; tail usually notched. *Adults*: White-bellied

phase: Upperparts olive-gray, brownish on head; tail and primaries deep grayish brown, the outer web of outside feather lighter; wing coverts dusky with two light bands; orbital ring dull whitish; chest and sides of breast gray, almost like back; rest of underparts dull white, or very pale yellow; bill brownish or blackish below. Yellow-bellied phase: More olivaceous or brownish olive above, chest olive or buffy olive; belly primrose or sulphur-yellow. Young: Like white-bellied adults, but upperparts grayish brown instead of olive, and wing bands light buffy.

COMPARISONS.—The small narrow bill in conjunction with the dark chest band usually distinguish *hammondi* from all others in the genus *Empidonax*. The outside primary is longer than the fifth instead of shorter as in *difficilis* and *wrighti*.

RANGE.—Breeds in Canadian and Transition Zones from southeastern Alaska, southern Yukon, central Alberta, and western Montana south to Colorado; winters from northern New Mexico to Guatemala.

STATE RECORDS.—The Hammond Flycatcher occurs in New Mexico during spring and fall migration only. In the spring, it was taken May 4, 1892, on the southern boundary of the State, 100 miles west of the Rio Grande (Mearns). The earliest records in the fall are July 30, 1883, near Willis (Henshaw), and August 25, 1906, in Santa Clara Canyon (Bailey), for northern New Mexico; and August 31, 1886, at Apache (Anthony), for the southern part of the State. Migration continues for about a month and the latest dates are those of a specimen taken September 27, 1908, at Redrock (Goldman) [and one noted September 30, 1916, near Gallup (Skinner)]. The species apparently is not common in New Mexico, but in addition to the above records it has been noted September 7, 1908, in the Florida Mountains (Goldman); September 19, 1873, at Fort Bayard (Henshaw); and September 19, 1908, in the Burro Mountains (Goldman).—W. W. COOKE.

NEST.—In willows, cottonwoods, aspens, or coniferous trees, 2 to 50 feet from the ground; made of plant stems and fibers, bark, and down, sometimes lined with grass tops, hair, feathers, bud scales, and hypnum moss. *Eggs:* Usually 3 or 4, creamy white, generally unspotted but sometimes with small brown dots around the larger end.

GENERAL HABITS.—The small-billed, dark-chested Hammond Flycatcher leaves the low country entirely in the summer, Mr. Henshaw says, "finding in the glens and recesses of the pine woods of the mountains or the alpine streams, with their fringes of alders, its chosen retreats" (1875, p. 362). According to his observation, it lacks most of the dash and spirit characteristic of the family, its notes being a soft *pit*, and in the breeding season, a low lisping whistle.

A specimen taken August 25, 1906, in the Jemez Mountains was well along with its molt.

WRIGHT FLYCATCHER: *Empidonax wrighti* Baird

DESCRIPTION.—*Male:* Wing 2.7–2.9 inches, tail 2.5–2.8, bill .6–.7, width at base .2–.3. *Female:* Length about 5.2, wing 2.4–2.7, tail 2.1–2.4. *Adults:* Like *hammondi*, but bill longer; and *outside primary shorter instead of longer than fifth*; anterior underparts paler and less uniform; outer web of outer tail feather *abruptly white*.

RANGE.—Breeds in Canadian and Transition Zones from British Columbia, east of Cascades and coast ranges, southwestern Saskatchewan, and Manitoba (?)

south to western Texas, New Mexico, and California; winters from northern to southern Mexico.

STATE RECORDS.—The Wright Flycatcher has been found breeding in northern New Mexico. A nest containing young was found July 18, 1904, at 7,400 feet near Taos (Bailey); and on the east side of the Sangre de Cristo Mountains in San Miguel County, it was found breeding most commonly at 9,000 feet (Mitchell). It also breeds at 6,800 feet near Willis (Henshaw); at 7,000 feet at Fort Wingate (Hollister); Santa Fe (Henshaw); [7,500 feet near Santa Fe (Jensen, 1922) at 8,000 feet, 7 miles east of Santa Fe, June 23, 1927 (Ligon).]

In the fall migration it was taken at 9,900 feet near Hopewell (Gaut); and near Glen north of Roswell September 22, 1904 (Hollister). This last record marks the most eastern limit of the range in the State and also about the latest date at which the species occurs in New Mexico. It was found at Apache until September 16 (Anthony).

In the spring, it occurs as a migrant in southwestern New Mexico, where it was noted April 6-30, 1886 (Anthony); April 22, 1892, on the southern boundary, a hundred miles west of the Rio Grande (Mearns); Silver City, April 22-June 6, 1883 (Marsh). At Rinconada the first was taken April 29, 1904 (Surber).—W. W. COOKE.

NEST.—“A neat, compact, deep-cupped nest in a crotch of a bush or sapling; commonly lined with feathers or hair” (Coues). Eggs: 3-4, white, unmarked.

GENERAL HABITS.—In Colorado in summer, Mr. Henshaw found the Wright Flycatcher a bird of the mountains, frequenting deciduous trees and bushes along streams; and in Arizona he found it among the oak openings; but in the vicinity of Santa Fe he saw it on pinyon-clad hills, and at Lake Burford Doctor Wetmore found it common among junipers and pines on the dry hillsides above the gulches. Sometimes, the small birds were seen perching near the ground, at others mounting thirty or forty feet in the yellow pines. Sometimes, Doctor Wetmore says, “they hopped restlessly from one perch to another trying several in succession before being satisfied. . . . The ordinary call note was a loud *tsee-wick*, given almost as one syllable, that when near at hand was startlingly like the *chebec* of the Least Flycatcher. . . . The males had a peculiar jerky song divided into couplets with slight pauses between, that may be represented by the syllables *see-wick*, *tsee-ee*, *see-wick*, *tsil-ly tsee-ee*” (1920a, p. 401). One that we found in a cottonwood grove near Taos, when not too busy feeding its young in the nest over our tent, kept up a pleasant *see-wick*, *see-wick*, *see-wick*, and *swee-hoo*.

Two nests, found by H. H. Sheldon in California, were “very beautifully constructed; each was placed in a manzanita bush, and composed of bark fibers of the same, so as to resemble the surroundings” (1907, p. 189). Of two discovered in northern Nevada by Doctor Taylor, one was fastened to its supporting branches with sheep’s wool and the other with spider-web. One of the females while adding material was “all the while uttering a series of ‘ker-wit’ call-notes, and occasionally notes of different inflection” (1912, p. 376).

ADDITIONAL LITERATURE.—PIERCE, W. M., Condor, XVIII, 180, 181, 1916.

GRAY FLYCATCHER: *Empidonax griseus* Brewster

DESCRIPTION.—*Length*: About 5.2 inches. Similar to *E. wrighti* but wing averaging decidedly longer, tail shorter, bill longer and relatively narrower, tip darker than base and *coloration much grayer above*.

REMARKS.—“While the two phases of coloration (the one with lower parts white and that with underparts primrose-yellow) are no more different in this form than in *E. wrighti*, they seem to be mainly seasonal, a large majority of those which are white or very faintly tinged with yellow beneath, being spring and summer birds while those decidedly yellowish beneath were nearly all obtained in autumn or winter” (Ridgway).

RANGE.—Breeds in Sonoran Zone from Oregon, Nevada, Colorado, and New Mexico south to southern end of Mexican tableland; winters from southern California and southern Arizona south to Puebla and Tepic.

STATE RECORDS.—The Gray Flycatcher comes into the extreme southwestern part of New Mexico probably as a rare visitant. It was taken May 5, 1892, on the boundary line 100 miles west of the Rio Grande (Mearns), and at Apache (Anthony). The specimen that was taken May 3, 1872, in El Paso County, Colorado, must have crossed northern New Mexico in its wanderings.—W. W. COOKE.

NEST.—Mainly on canyon or mountain sides, in conifers, oaks, willows, and other trees, 2 to 40 feet from the ground; deeply cupped, some compactly and others loosely built, mainly of dry shredded inner bark of the willow, lined with finer shreds sometimes mixed with down feathers. *Eggs*: 2 to 4, cream-buff, sometimes sparsely dotted, chiefly about the larger end, with burnt-umber.

GENERAL HABITS.—In the Huachuca Mountains in Arizona, Mr. Swarth found the Gray Flycatcher a common migrant. From the middle of April to the middle of May, he says, the three *Empidonaxes*, *hammondi*, *wrighti*, and *griseus* taken together were a feature of the avian landscape in all parts of the mountains; *hammondi* along the canyons and in the pines, *wrighti* in the oak belt, and *griseus* in the more barren country along the base of the range, where there were rough boulder-strewn hills with but a scattering growth of scrubby live oaks; and during this time he says there was hardly a place where one or more of some one of these small flycatchers could not be seen, darting from tree or bush after some passing insect, or sitting on a twig with drooping wings and twitching tail (1904 p. 27).

ADDITIONAL LITERATURE.—GRINNELL, JOSEPH, The Biota of the San Bernardino Mountains, Univ. Calif. Publ. Zool., vol. 5, no. 1, pp. 78-82, 1908.

BUFF-BREASTED FLYCATCHER: *Empidonax fulvifrons pygmaeus* Coues

DESCRIPTION.—*Length*: About 4.7-5.1 inches, wing 2.2-2.4, tail 1.9-2.1, bill .5, width at base .2. Coronal feathers and rictal bristles longer than usual in *Empidonax*. *Adults in spring and summer*: Upperparts hair-brown, tail and wings grayish brown, outer web of outside tail feather grayish white; wing bands grayish, buffy, or dull whitish; throat pale buffy, *chest and sides buffy or tawny*, belly pale buff or whitish; bill brownish or blackish above, yellowish below. *Adults in autumn and winter*: Upperparts and wing bands more buffy, underparts deeper colored, the chest tawny-buff, the throat and belly light yellow and buff. *Young*: Similar to

spring and summer adults, but upperparts browner and wing-bands dull buff or brownish buff.

RANGE.—Breeds in Upper Sonoran Zone from southern Arizona and New Mexico to southern Durango; winters south of United States to Jalisco, Tepic, Morelos, and Michoacan.



MAP 28. BUFF-BREASTED FLYCATCHER
Triangles mark all reported records

STATE RECORDS.—The Buff-breasted Flycatcher is a little known inhabitant of southwestern New Mexico. It probably breeds from about 5,000 feet to at least 8,000 feet, judging from the altitudes at which it has been found nesting in the neighboring mountains of Arizona. It ranges north to Inscription Rock, where old birds were noted feeding their young July 24, 1873 (Henshaw); and northeast to Fort Bayard (Brewster). [Two specimens were taken the first of May, 1915, in Apache Canyon, about 12 miles west of Aragon, and it has often been observed in the country west of the Black Range (Ligon, 1916-1918).]

In the fall migration, it was first noted, August 16, 1886, at Apache (Anthony); and in the spring, it arrived at Silver City, April 26, 1884 (Marsh).—W. W. COOKE.

NEST.—Saddled on a limb or built against a trunk 20-50 feet from the ground, resembling that of the Blue-gray Gnatcatcher, being small, deep, and compact, made of dried grasses, vegetable fibers, and spiders' silk, with sometimes a few feathers. *Eggs*: 3-4, pale buff or dull whitish, immaculate.

GENERAL HABITS.—In the Chiricahua Mountains of Arizona, Mr. Lusk found several nests of the Buff-breasted Flycatcher containing bright feathers; among them some yellow ones of the Audubon Warbler and a blue one of the Chestnut-backed Bluebird. A barred feather of a Whippoorwill neighbor also added interest to the collection. In the lower country where lizards climbed up the trunks of the sycamores, the nests were built out on the branches; but on the edges of the mountain parks where there were no lizards but many jays, the bark-colored nests were built against a tree trunk "in fifty per cent of the cases close in below a protecting stub," where they were well hidden (1901, p. 41).

In the sycamores where Mr. Lusk found an attractive small pair, he says, the breasts shone buff in the warm sunlight, flies were plentiful, and "every now and then the soft *pit, pit*, of the two, as they kept good account of each other's whereabouts, was varied by the *chicky-whew* of the male" (1901, p. 38). A variety of notes and ventriloquial calls add to the interest of the study of this rare little bird.

ADDITIONAL LITERATURE.—WILLARD, F. C., Condor, XXV, 189-194, 1923.

COUES FLYCATCHER: *Myiódhanes pertinax pallidivéntris* (Chapman)

DESCRIPTION.—*Length*: 7.7-8 inches, wing 3.8-4.4, tail 3.6-3.9. *Adults*: Upper-parts deep smoke-gray, chest uniform lighter gray, belly whitish or pale buffy yellowish; bill black above, yellow below. *Young*: Slightly darker, more olivaceous above, the upper tail coverts tipped with brown or buffy, and wings with two brown or buffy bands, underparts suffused with pale buffy; lower mandible and mouth orange-yellow.

COMPARISONS.—The Coues Flycatcher, about the size and general coloration of the Olive-sided may be distinguished from it by its *uniformly, unstreaked dark chest* and less conspicuous cottony flank tufts. (See p. 445.)

RANGE.—Mountains of central Arizona and western New Mexico south through Chihuahua, Sonora, and Durango to Tepic.

STATE RECORDS.—In the Chiricahua Mountains of Arizona the Coues Flycatcher is a common summer resident almost to the New Mexico line. A few birds pass east into New Mexico and one taken July 16, 1876, at Fort Bayard by Mr. Stephens was identified in the Biological Survey. The species was met in June, 1876, in the Zuni Mountains (Aiken); and a specimen taken July 10, just over the line in the White Mountains of Arizona.—W. W. COOKE.

NEST.—Preferably in conifers in the open but also in deciduous trees nearly hidden in foliage; deeply cupped, composed mostly of grasses, with some leaves, web, and catkins, covered with fragments of moss, lichens, and cobwebs. *Eggs*: 3, creamy buff, sparsely spotted with reddish browns and lilac tending to wreathe about the larger end.

GENERAL HABITS.—In the Huachuca Mountains of Arizona, Mr. Swarth found the Coues Flycatcher one of the characteristic birds of the pine regions. During the breeding season it was seen mainly between 8,000 and 10,000 feet altitude, after which period it descended to the oak groves of the canyons, where, if not seen, it was heard almost everywhere.

The male is fond of perching high, usually on the end of a dead limb at the top of a tall pine or fir, remaining there for hours, frequently uttering his call. As Mr. Swarth says, in character and tone, the call resembles that of the Olive-sided Flycatcher (1904, p. 24).

The bird's local name, derived from the slow, plaintive notes is Jose Maria (pronounced *Ho-say, Mah-ré-ah*), but as I heard it given in an Arizona snowstorm it lacked the first syllable of the *Ma-ré-ah*, being given as *Jo-say, ré-ah*. This simple phrase was repeated over and over as the large Flycatcher went and came, with the "sudden erratic flights" noted by Mr. Henshaw, low through the small trees bordering the live oaks. Sad-voiced friend of the mountains! Had he reached his summer home in the canyons above us only to be driven down by the snow that covered the mountains? In any case, when the storm was over he left, never to be seen again. Long after he had gone, however, his simple notes with their penetrating plaintive quality rang in my ears as a lament (1923a, p. 403; 1923b, p. 30).

WESTERN WOOD PEWEE: *Myióchanes richardsoni richardsoni* (Swainson)

DESCRIPTION.—*Length:* 6.2-6.7 inches, wing 3.1-3.5, tail 2.5-2.9, bill .4-.5, tarsus .4-.5. *Adults:* Upperparts dark grayish, tail grayish brown with lighter edges; wings dusky with two light bands and inner quill edgings; underparts heavily washed with olive-gray, throat, belly, and under tail coverts whitish. *Young:* Underparts somewhat suffused with pale brownish buffy.

RANGE.—Breeds from Alaska, southern Mackenzie, central Saskatchewan, and southern Manitoba south to northern Mexico and Lower California; migrates through Mexico and Central America; winters in Ecuador, Peru, and Bolivia.

STATE RECORDS.—The Western Wood Pewee has a most extended breeding range from Alaska to Mexico and from the Pacific to the Plains. It breeds in suitable places afforded by irrigation systems and groves of trees even among hot deserts, but more commonly in Transition Zone. In New Mexico the breeding range is zonally rather extended, from 3,800 feet at Mesilla, with young in the nest July 5, 1913 (Merrill); and 4,500 feet along the Rio Grande at Socorro, where a nest was found August 19, 1909 (Goldman); to Hondo Canyon, where they were evidently breeding August 6, 1904, at 9,500 feet (Bailey); 22 miles southeast of Taos, June 20, 1919, where they were observed rather commonly (Ligon); in northern Santa Fe County, where they were common near water up to 8,000 feet (Jensen, 1922); and in the Zuni Mountains where they ranged almost to the top of the highest peaks (Goldman). The breeding range extends east to the Pajarito valley at 4,700 feet near Montoya (Bailey); probably to the Sierra Grande where they were common August 10-22, 1903 (Howell); and to Roswell, 3,300 feet, June 27, 1913 (Ligon). [In 1916 in the western part of the State they were common in the

canyons that lead out of the Black Range, and common in the Mt. Taylor country, nesting from 8,000 to 9,000 feet, young being found in the nest July 4, at 8,000 feet, north of Mt. Taylor. A nest with three fresh eggs was found at Chloride, June 2; fresh eggs near Chloride, June 13, 1916; young following adults for food on the street in Chloride August 1, 1919; and on the same date a nest containing young near Chloride at about 6,200 feet; nests found at about 5,000 feet on the Rio Grande at Albuquerque (1916-1918), in the Cuchillo Hills northeast of Fair View old seen with young, August 4 (Ligon, 1919).]

It is a late breeder like its eastern relative and rarely has eggs before June. It was incubating, June 21, 1903, near Montoya (Bailey); young were still in the nest, August 19, 1909 (Goldman); and only just out of the nest in the Santa Clara Canyon, August 21, 1906 (Bailey).

In the fall the species ranged to 10,000 feet in the Jemez Mountains, August 28, 1906 (Bailey); while at the same time it occurred as low as Carlsbad, 3,100 feet, August 1-14, 1910 (Dearborn). For the most part the State is deserted in September—by the middle of the month in northern New Mexico and later in the southern part—but one was seen at Mesilla October 1, 1913, and in the previous year the species had remained until October 25 (Merrill). The last one noted in 1902 near Roswell was on September 21 (Gaut); while in 1889 it remained near Apache until the last of the month (Anthony).

On the return in the spring, the earliest date is April 30, 1892, when one was taken on the southern boundary line 100 miles west of the Rio Grande (Mearns). At Chloride the first seen was May 10, 1915 (Ligon); and it does not become common before the middle of May. [Near Lake Burford it was fairly common May 23-June 19, 1918 (Wetmore), and was observed in the Pecos Valley where there was timber, May 27 to June 22, 1924 (Ligon).]—W. W. COOKE.

NEST.—In orchard or forest trees, 6 to 40 feet from the ground, either saddled on branches or at their forks; compactly interwoven of decayed grass, wood, plant fibers, down, fine strips of inner bark of juniper and sage, and grass tops; lined with fine grass, down, plant fibers, wool, and rarely a few feathers, sometimes covered with spider's web. Eggs: Usually 3, white, irregularly wreathed around the larger end with blotches and minute specks of brown and purple.

FOOD.—As 99.93 per cent of the contents of the stomachs examined was animal, the birds found in orchards are there for no harm. Flies, including horse flies, crane flies, robber flies, and house flies, amounted to 44.25 per cent; and wasps and bees, 39.81 per cent (in which were no honey bees). The rest of the animal food (15.87 per cent) is made up chiefly of beetles, bugs, moths and caterpillars. It probably takes 2,400 insects each 10-hour day. Of these a large majority are harmful species (Beal).

GENERAL HABITS.—In the breeding season the Western Wood Pewee, with its erect trim form, is one of the familiar birds of the lower parts of the mountains, especially along the edge of the timber; and near Santa Rosa, the last of May, it was met with frequently in the Upper Sonoran canyons. Its call of *tu-weer* or *tu-tu-tweer*, sometimes varied to *tweer-eer*, which becomes one of the commonplaces of the way, has been heard by Doctor Grinnell in the San Bernardino Mountains before there was a trace of light in the morning and after all but owls and nighthawks were silent for the night.

On the Gila River, where Mr. Ligon found the Wood Pewee abundant, its favorite nesting tree seemed to be the walnut, growing along creeks and canyons; but in Chloride Canyon he found a nest in a box elder, made of dead grass and lined with the yellow tops of fresh grass. One that we found on the edge of the plains was in a sapindus tree, and lined with feathers and wool. The depth of the nest Mr. Henshaw attributed to the high winds of its breeding grounds, and he calls attention to the fact that while placed in a conspicuous position, it has concealing materials like the bark of the tree. At Mesilla Park, Professor Merrill found the birds nesting mainly in flat forks of the smaller limbs of big cottonwoods, but he found a nest with young in an ash in Soledad Canyon.

Along the Rio Grande at Socorro, Major Goldman found the Pewees abundant in the timber, and heard their note all through the day. On August 19, 1909, he wrote: "A female was found brooding two half-fledged young in a nest placed in an exposed situation between two forking cottonwood branches. It was a hot day and the mother bird was standing over the young which were panting with heat. On climbing up I found the nest was composed almost entirely of fine shreds of cottonwood bark" (MS).

OLIVE-SIDED FLYCATCHER: *Nuttallórmis boreális* (Swainson)

DESCRIPTION.—*Length:* 7.1–7.9 inches, wing 3.9–4.5, tail 2.8–3.5, bill .5–.7, tarsus .5–.6. *Adults:* Upperparts dark olive-gray, darker on crown; wings and tail blackish, wings with inconspicuous lighter edgings; *sides of rump with patches of white or yellowish white cottony feathers*, usually concealed but sometimes spreading over closed wing; underparts with *white throat and median tract* often tinged with pale yellow, *between olivaceous, indistinctly streaked sides*. Bill, black above, mostly yellowish below. *Young:* Similar but more brownish or sooty, wing edgings buffy or brownish.

RANGE.—Breeds in Canadian and Transition Zones from central Alaska, southern Mackenzie, southern Keewatin, central Quebec and Cape Breton Island south to Massachusetts (in mountains to North Carolina), northern New York, Michigan, western Kansas, and in the coniferous forests of the western United States to New Mexico, Arizona, and California; migrates through Mexico and Central America; winters from Colombia to Peru.

STATE RECORDS.—No nests of the Olive-sided Flycatcher have been taken in New Mexico and its usual inclusion in the list of the breeding birds of the State rests on its presence during the time that would naturally be considered as the nesting season. It is one of the latest migrants and often remains until June in places where it does not breed. [At about 7,500 feet, 35 miles northeast of Silver City it was found April 19, 1919 (Ligon)]. At Hachita Grande Mountain it was taken May 18–19, 1892 (Mearns); at Silver City it was seen May 20–29, 1884 (Marsh); at Clouderoft, May 29–June 2, 1900 (Bailey); at Shiprock May 19–June 16, 1907 (Gilman); at Willis, May 23, 1900 (Birtwell); at Rinconada, June 1, 1904 (Surber). Part of these records undoubtedly represent individuals in migration.

Probable breeding records come from the headwaters of the Pecos River where they were seen from July 15, 1903, near Willis at 7,500 feet to July 25; and at 11,600

feet at the foot of Pecos Baldy (Bailey); [it is well distributed over the Sangre de Cristo Range near Cowles and Taos at elevations of 8,000 to about 11,000 feet (Ligon, 1919).] In 1904 in the Taos Mountains, the species was common in the Wheeler Peak amphitheater, 11,400-12,000 feet, July 20-August 2, and was seen August 7, at Lake Fork, just above Twining, at 10,700 feet (Bailey). [It was noted, June 18, 1924, in timber northeast of Wheeler Peak at about 10,000 feet Ligon).]

In the fall migration specimens were taken August 13 and 14, 1904, at about 8,000 feet in Arroyo Hondo (Gaut). It was noted August 20, 1904, at the foot of the Culebra Mountains (Bailey), and by September 6, 1889, had appeared at Apache (Anthony). It had been already seen August 2, 1900, near Kingston (Metcalf); and the last one taken near Willis was on September 6, 1883 (Henshaw).—W. W. COOKE.

NEST.—Usually 30 to 60 feet from the ground in coniferous trees; shallow, made of twigs, rootlets, and bark ravelings, plant stems and sometimes moss. *Eggs*: Generally 3, creamy or pinkish, wreathed around the larger end with different shades of reddish brown, with purple or lilac shell markings.

FOOD.—Almost wholly winged insects, and of these principally (April to September, 82.56 per cent) hymenoptera. Of 69 stomachs examined, 16 contained honey bees. Unlike the kingbirds, which select the drones, these stomachs included 36 workers and 27 drones, which would indicate that if the bird were abundant or domestic like the Phoebe, it would be a pest to bee keepers; but as all but occasional individuals live in the forested mountains, they can do little harm.

GENERAL HABITS.—In going up from the plains into the Pecos Mountains, the Olive-sided Flycatcher was first gratefully encountered at 7,500 feet on Willow Creek, perching characteristically on the tip of a spruce, and from that on was heard at intervals up to 11,600 feet, at the base of Pecos Baldy. When sitting on his spruce tip merely soliloquizing, his call was a soft *pupupip*, a two-syllabled *pu-pu*, or occasionally a four-syllabled *pu-pu-pu-pu*; but when roused he gave a loud, clarion-like call which, from association with his setting, was easily rendered *Pi-cea'* top.

ADDITIONAL LITERATURE.—DIXON, JOSEPH, Condor, XXII, 200-202, 1920 (nesting).—HUNT, RICHARD, Condor, XXV, 202-208, 1923 (phonetics of bird songs).—SAUNDERS, A. A., Condor, XXVI, 209-213, 1924 (study of bird sounds).

VERMILION FLYCATCHER: *Pyrocéphalus rubinus mexicanus* Sclater

PLATE 44

DESCRIPTION.—*Length*: About 5.5-6.2 inches, wing 3.2-3.4, tail 2.6-2.8. Head of male with full, globular crest; bill slender, narrow at base like *Sayornis*; tail nearly even, of broad feathers. *Adult male*: Erectile crest and underparts bright red, underparts sometimes partly orange; upperparts and stripe on side of head grayish brown; wings and tail blackish, with lighter edgings; wing linings edged with pink or scarlet. *Adult female*: Slightly crested head and upperparts grayish brown; underparts dull white, breast and sides lightly streaked with brown, belly tinged with yellow, salmon, or red. *Immature male* (second year?): Like adult female, but posterior underparts suffused with salmon-pink or pale orange-red. *Young*: Above grayish brown, the feathers tipped with pale buff or whitish, giving a scaled effect; wings and tail with buff or whitish edgings; underparts white, chest and sides streaked with brownish gray.



VERMILION FLYCATCHER

MALE

FEMALE

feet at the foot of Pecos Baldy (Bailey); [it is well distributed over the Sangre de Cristo Range near Cowles and Taos at elevations of 8,000 to about 11,000 feet (Ligon, 1919).] In 1904 in the Taos Mountains, the species was common in the Wheeler Peak amphitheater, 11,400-12,000 feet, July 20-August 2, and was seen August 7, at Lake Fork, just above Twining, at 10,700 feet (Bailey). [It was noted, June 18, 1924, in timber northeast of Wheeler Peak at about 10,000 feet Ligon).]

In the fall migration specimens were taken August 13 and 14, 1904, at about 8,000 feet in Arroyo Hondo (Gaut). It was noted August 20, 1904, at the foot of the Culebra Mountains (Bailey), and by September 6, 1889, had appeared at Apache (Anthony). It had been already seen August 2, 1900, near Kingston (Metcalf); and the last one taken near Willis was on September 6, 1883 (Henshaw).—W. W. COOKE.

NEST.—Usually 30 to 60 feet from the ground in coniferous trees; shallow, made of twigs, rootlets, and bark ravelings, plant stems and sometimes moss. Eggs: Generally 3, creamy or pinkish, wreathed around the larger end with different shades of reddish brown, with purple or lilac shell markings.

FOOD.—Almost wholly winged insects, and of these principally (April to September, 82.56 per cent) hymenoptera. Of 69 stomachs examined, 16 contained honey bees. Unlike the kingbirds, which select the drones, these stomachs included 36 workers and 27 drones, which would indicate that if the bird were abundant or domestic like the Phoebes, it would be a pest to bee keepers; but as all but occasional individuals live in the forested mountains, they can do little harm.

GENERAL HABITS.—In going up from the plains into the Pecos Mountains, the Olive-sided Flycatcher was first gratefully encountered at 7,500 feet on Willow Creek, perching characteristically on the tip of a spruce, and from that on was heard at intervals up to 11,600 feet, at the base of Pecos Baldy. When sitting on his spruce tip merely soliloquizing, his call was a soft *pupupip*, a two-syllabled *pu-pu*, or occasionally a four-syllabled *pu-pu-pu-pu*; but when roused he gave a loud, clarion-like call which, from association with his setting, was easily rendered *Pi-cea'* top.

ADDITIONAL LITERATURE.—DIXON, JOSEPH, Condor, XXII, 200-202, 1920 (nesting).—HUNT, RICHARD, Condor, XXV, 202-208, 1923 (phonetics of bird songs).—SAUNDERS, A. A., Condor, XXVI, 209-213, 1924 (study of bird sounds).

VERMILION FLYCATCHER: *Pyrocéphalus rubínus mexicanus* Selater

PLATE 44

DESCRIPTION.—Length: About 5.5-6.2 inches, wing 3.2-3.4, tail 2.6-2.8. Head of male with full, *globular* crest; bill slender, narrow at base like *Sayornis*; tail nearly even, of broad feathers. *Adult male*: *Erectile crest and underparts bright red*, underparts sometimes partly orange; *upperparts and stripe on side of head grayish brown*; wings and tail blackish, with lighter edgings; wing linings edged with pink or scarlet. *Adult female*: Slightly crested head and upperparts grayish brown; underparts dull white, breast and sides lightly streaked with brown, belly tinged with yellow, salmon, or red. *Immature male* (second year?): Like adult female, but posterior underparts suffused with salmon-pink or pale orange-red. *Young*: Above grayish brown, the feathers tipped with pale buff or whitish, giving a scaled effect; wings and tail with buff or whitish edgings; underparts white, chest and sides streaked with brownish gray.



VERMILION FLYCATCHER

MALE

FEMALE

RANGE.—Breeds in Lower Sonoran Zone from southeastern California, southern Nevada, southwestern Utah, Arizona, southern New Mexico, and Texas south to Yucatan, Guatemala, and Honduras. In winter, shifts north and west from its breeding area, in California, to Santa Barbara.

STATE RECORDS.—The Vermilion Flycatcher was added to the list of New Mexico birds by Henry, who discovered a single individual in May, 1853, at Fort Webster, and later obtained another at Fort Thorn. It probably breeds in the San Luis Mountains, where it was taken July 7, 1892, and near there at Dog Spring July 28, 1892 (Mearns). Near Beaver Lake, at 7,000 feet, it nested during 1913, the male arriving April 2, being joined by a mate two days later, and collected May 24 (Ligon). At Mesilla, a brood had just left the nest, July 23, 1913 (Merrill). It was noted on the upper Gila May 8, 1911, and June, 1915 (Rockhill). [It has been found common in the southwestern part of the State, ranging and nesting to Alma, to the Junction of the three Gila Rivers, north of Silver City; east as far as Silver City, and into the valley of the Mimbres River. Fresh eggs were found, April 28, 1916, in the northern part of its range (1916-1918); it was common in the Animas Mountains, May 7 and 8, 1920, especially about the Culberson Diamond A Ranch. A male was found 1 mile northeast of San Marcial, May 3, 1924, the farthest north at which it was observed in the Rio Grande Valley (Ligon). It has been found at Fort Bayard in early spring (Rockhill, 1919).] Specimens were taken at Adobe Ranch, July 28, 1908 (Birdseye). The species is a common breeder just across the line in southeastern Arizona.

In the fall migration, several were seen at Redrock September 30, 1908 (Goldman). The last were noted at Mesilla, September 27 and October 1, 1913 (Merrill).—W. W. COOKE.

GENERAL HABITS.—The Vermilion Flycatcher with his most unflycatcher-like scarlet crown and underparts is nevertheless a true scion of the family, darting out after insects and returning to his branch with all the mannerisms of a dusky Western Wood Pewee. But his gay plumes do not pass for naught. In the nesting season he mounts high above the earth and puffing out his scarlet feathers hovers twittering in midair as if to call all spectators to witness, after which he floats down with inimitable grace. We saw him give this flight song in an oak mott in southern Texas and Mr. Ligon witnessed it in an open pine glade in Socorro County at 7,000 feet, where a pair were nesting. At Mesilla Park, where the birds spend the time from the first of May until October, their haunts and habits are much the same as those of the Western Wood Pewee.

In southern Arizona a pair nested for years in the trees around the house of Mr. Willard, sometimes using the same fork for a nest twice in the same year. From their behavior he felt convinced that they were the same two birds (1918, p. 167).

It is a great satisfaction to learn that in Argentina the South American form of the Vermilion Flycatcher is protected in certain territories by a decree of the president.

ADDITIONAL LITERATURE.—GRINNELL, JOSEPH, *Mammals and Birds of the Colorado Valley*, Univ. of Calif. Publ. in Zoology, Vol. 12, No. 4, 153-155, 1914.—TORREY, BRADFORD, *Nature's Invitation*, 266-272, 1904.

LARKS: Family Alaudidae

The Horned Larks, our American representatives of the lark family, are such terrestrial birds that they rarely light in trees but live and nest on the ground and walk or run instead of hop, their tarsus being peculiarly scaled and their feet having long, straight, hind claws. Their earth-colored plumage, which varies protectively in shade with the color of the soil the species frequent, is offset by black directive marks, erectile tufts or "horns," black shield, and tail feathers. Their bills are compressed conoid, acute, the nostrils completely concealed by feathers—a useful protection, perhaps, as they live on wind-swept arid plains, dusting instead of bathing themselves.

DESERT HORNED LARK: *Otócoris alpestris leucolaéma* (Coues)

PLATE 45

DESCRIPTION.—*Male*: Length (skins), 6.2–6.4 inches, wing 4–4.3, tail 2.7–3, bill .4–.5, tarsus .8–.9. *Female*: Length (skins), 5.7–6 inches, wing 3.7–4, tail 2.3–2.6, bill .3–.4, tarsus .8. General coloration extremely pale. *Adult male in breeding plumage*: Front of crown, horn-like tufts, cheek stripe, and chest shield black; forehead, and stripe over eye, usually yellow, sometimes white; back of head and neck, bend of wing, and upper tail coverts, pinkish cinnamon; back, wings, and middle pair of tail feathers dark brown, edged with buffy; rest of tail brownish black, outside pair edged with white; throat yellowish white; rest of underparts white, sides and flanks shaded with cinnamon. *Adult female in breeding plumage*: Similar to adult male, but black of head replaced by brownish and buffy, back of neck, bend of wing, and upper tail coverts cinnamon without pinkish tinge, back of neck narrowly streaked; line over eye and ears buffy; sides and flanks streaked with dusky. *Adult male in winter plumage*: Like the summer male but black areas obscured and upperparts more uniform, the brownish areas more pinkish, those on back of head and neck with grayish tips, line over eyes yellow, throat deeper yellow; breast marked with dusky; sides and flanks darker. *Adult female in winter plumage*: Like summer female but all black areas obscured; upperparts more uniform and more buffy ochraceous; breast strongly tinged with buff and spotted with pale dusky. *Young in juvenal plumage*: Upperparts dull brownish yellow, feathers with subterminal bar of brown and spot or bar of white or buffy; line over eye buffy, throat and sides of head spotted, throat sometimes tinged with yellow, breast with admixture of black, belly whitish.

COMPARISONS.—The Horned Larks, with their generally similar color pattern, which varies slightly, not only in the different subspecies but also in the various plumages of season, sex, and age, are so extremely difficult to identify, especially outside of the breeding season, when they occur together, that all specimens collected should be sent to a natural history museum or to the U. S. Biological Survey where there is adequate material for comparison of measurements and plumage.

RANGE.—Breeds in southern Alberta and interior of western United States, from western to central Montana south to central-western Texas, eastern and central-southern New Mexico, southern Utah, and southern Nevada; winters south to south-eastern California, Sonora, Chihuahua, and southern Texas.

STATE RECORDS.—The Horned Lark is a common breeder on the plains and in the lower parts of the mountains in New Mexico. On July 27, 1820, Major Long's Expedition to the Rocky Mountains reported several shorelarks seen on the upper part of the Mora River (James, 1823, Vol. II, p. 80). Four forms occur, three forms

From Biological Survey

HORNED LARKS DISPOSING OF AMARANTH SEEDS



breeding in the State, *leucolaema* in the east and central, *occidentalis* in the west-central, *aphrasta* in the southwest; while *enthymia*, a winter migrant, has been recorded from Las Vegas Hot Springs, December 13, 1882 (Batchelder). The present form, *leucolaema*, is the most common and widely extended form in New Mexico, breeding over the eastern and south-central part of the State, including Carlsbad, the



MAP 29. HORNED LARKS

1. Desert Horned Lark. 2. Montezuma Horned Lark. 3. Chihuahua Horned Lark. Shaded areas show general breeding ranges. Triangles, a few breeding or breeding season records

southwestern foothills of the Capitan Mountains, [the Jornada del Muerto, where it nests abundantly, the young hatching out generally the latter part of March (Ligon, 1916-1918)], Santa Rosa, and Espanola. At this last locality its range approaches closely to that of *occidentalis*, the type locality of which is Santa Fe. The Desert Horned Lark breeds from the lowest place in the State, 3,500 feet, at Carlsbad, to Engle, 4,700 feet, where they were abundant and the young were already out of the nest June 13, 1913, southeast to the salt flats near Tularosa. A few range up the Cuchillo to Willow Spring, breeding there at about 6,500 feet (Ligon); others breeding

at about 7,500 feet near Taos, where old ones with young were noted in early July 1904 (Bailey); and to 8,000 feet at Halls Peak (Barber). Most of the eggs are laid between May 15 and June 15; [between Roswell and Fort Sumner, young were noted June 20, 1918 (Ligon)]. During 1913, none were seen on the west slope of the Sacramento Mountains, nor in crossing the range by way of Cloudercroft, but when the 4,000-foot level was reached on the lower Penasco June 19, they were found common with young already out of the nest. They were abundant thence to Roswell and up the Pecos to Santa Rosa, and less common to Glorieta July 11. Near Santa Rosa, July 8, many nests contained eggs of the second sets (Ligon).

After the young are fully grown both old and young wander up the mountain sides to the summits of the highest peaks. One was taken July 28, 1903, at 12,000 feet on Pecos Baldy, and a flock seen August 20, 1904, at 13,300 feet on Culebra Peak (Bailey).

The species is more numerous in New Mexico during the winter than in the summer. Near Koehler Junction it was the commonest bird on the open prairie, July 28–October 24, 1913 (Kalmbach). In Union County, it was very abundant, November 5, 1915, and at the south end of the San Mateo Mountains abundant on open mesas and ridges, December 7–10, 1915 (Ligon); on the Carlsbad Bird Reserve it was seen in January, 1915; noted during the winter of 1915–1916 [and abundant in December, 1916 (Willet)].—W. W. COOKE.

NEST.—A slight depression in the ground, often at the base of a tuft of grass, lined with a few blades of grass. *Eggs*: Usually 3, mostly gray, sometimes with a faint greenish tinge, profusely sprinkled and blotched with shades of pale brown. An occasional set is more evenly and lightly colored, producing a uniform pale gray appearance.

FOOD.—Vegetable matter, 79.4 per cent, of which nearly six-sevenths are weed seed, and 20.6 per cent insects, including such pests as May beetles, and their larvae (white grubs), leaf beetles, clover-leaf and clover-root weevils, alfalfa weevils, the potato-stalk borer, nut weevils, caterpillars, bill bugs, and the chinch bug. Cutworms are freely eaten and grasshoppers are a favorite food. In Colfax County, July 28–October 24, they made up 69 per cent (Kalmbach). "The Horned Lark by its services to agriculture earns a right to live, and deserves protection at the hands of man" (McAtee).

GENERAL HABITS.—The Horned Larks, of whatever subspecies, with their protective earth colors and handsomely contrasting black horns and shields are wayside friends of the traveler over the arid plains, their quiet unsuspecting ways and their cheery songs being doubly appreciated where all other birds have been left behind. On the brown plains of northeastern New Mexico they were actually the only birds that we saw at a distance from water, although when even a small pool was encountered, meadowlarks might be added to our list. But while the larks seem independent of water, their food is so largely weed seed that they lack the supply of moisture afforded insect eaters and must know where to go to drink. On the San Juan River of the Navajo Reservation, French Gilman found a place where the water spread out and made several small streams, which proved a favorite watering place for them. Flock after flock came to drink every day, he says. The springs on the mesas and plains were also frequented by them in great numbers.

At the northern end of the Staked Plains we found them abundant and characteristically occupied, some running over the ground picking up seeds and insects, some flying up only to drop down again, and others giving their flight song in the air. Although the males, says Mr. Ligon, "usually sit on a low bush or tuft of grass and sing, they also fly high in the air floating about singing at all hours of the day" (MS). As they fly overhead, Ernest Thompson Seton writes, "they are clearly distinguished by their long dark wings, black tail, white body, dark head and neck, and their occasional call 'chee chup,' which happens also to be given as an Indian name of the bird in the north" (MS).

Mr. Ligon considers the Horned Larks the most abundant nesting birds in New Mexico. From the Pecos Valley, between Roswell and Fort Sumner, June 16-21, 1918, he wrote: "These sociable little fellows are to be seen everywhere except in the more broken or brushy parts of the valley along the river. At the McKenzie Ranch they were seen feeding among the stock in the corrals. I saw young birds, June 20, that could fly only short distances, following the parent birds for food. No doubt many were nesting, as on several occasions I saw the males high up in the air, almost beyond vision, floating and singing. The heat was intense during the middle of the day and at this time the Larks were often seen in the shadows of fence posts" (MS).

On Pecos Baldy, July 28, 1903, on an open grassy slope at 12,000 feet, we found Pipits and half a dozen or more of the Horned Larks, including half grown young; and afterwards they were seen in the same place a number of times.

On favorite nesting grounds of the Prairie Horned Lark, George Miksch Sutton has noted birds with recognizable mannerisms season after season, and he infers that they often remain mated for life. During courtship, in giving the ecstatic flight song, the male swings back and forth in wide circles in the high sky. The part which the female plays in the courtship is slight, Sutton says, but occasionally he has heard her "answer the male's full song with a bright snatch of her own." In choosing the nesting site she looks for a natural cavity; then "pecks, scratches, and kicks out the dirt rapidly and determinedly." In looking for nesting material, she "rarely flies but prefers to run about as she selects grasses and weed fibers" (1927, pp. 135-136).

After the nesting season, in September, in the days of the Wheeler Survey around Santa Fe, Mr. Henshaw found Montezuma Horned Larks gathered in large flocks scattered over the arid plains where they fed upon seeds and insects picked up among the sagebrush and other bushes. During the latter part of November the plains between Santa Fe and Fort Wingate were "fairly alive with these birds, and flocks numbering thousands were met with at short intervals" (1875, p. 310).

In winter—on December 19 and 20, 1918—at Deep Well Camp, northeast of Engle, when a terrible storm was raging, preceding the coldest weather in years, Mr. Ligon found Horned Larks gathered in great numbers, so hard pressed that they came for food about the door, into the sheds, and even into the house when they found a door open (MS).

ADDITIONAL LITERATURE.—FORBUSH, E. H., Educational Leaflet 53, Nat. Assoc. Audubon Soc.—McATEE, W. L., Bull. 23, Biol. Surv. U. S. Dept. Agr., 1905.—SUTTON, G. M., Wilson Bull., 1927, XXXIX, 131-141, 1927 (habits).

MONTEZUMA HORNED LARK: *Otócoris alpestris occidentális* McCall

DESCRIPTION.—Size of *leucolaema* but darker, more cinnamonaceous or rufescent on entire upperparts, in summer especially noticeable on the back of the neck.

RANGE.—In summer, from central Arizona to central New Mexico; in winter, south to central-western Texas, and northern parts of Chihuahua and Sonora.

STATE RECORDS.—When McCall spent the summer of 1850 in New Mexico, he found Horned Larks breeding near Santa Fe, and gave them the name of *occidentális*. He met them here at the extreme northeastern limit of their range, whence they extend in the breeding season south to Albuquerque (Bailey). The subspecies extends from Santa Fe westward to Fort Wingate (Henshaw). On March 27, 1885, one was taken by C. H. Marsh at Lone Mountain. During the winter the form spreads out over southern New Mexico south nearly to the southern boundary and east to Roswell (Gaut).—W. W. COOKE.

CHIHUAHUA HORNED LARK: *Otócoris alpestris aphrásta* Oberholser

DESCRIPTION.—*Male:* Length (skins), 5.7-6.2 inches, wing 3.9-4.1, tail 2.5-2.8, bill .4-.5, tarsus .8. *Female:* Length (skins), 5.9-6 inches, wing 3.6-3.8, tail 2.2-2.5, bill .3-.5, tarsus 7.5-8. Much smaller, more uniform, and more reddish above than *leucolaema*; decidedly smaller and somewhat less deeply colored than *occidentális*.

RANGE.—Nearly or wholly resident in southeastern Arizona, the southwestern corner of New Mexico, and southeast through Chihuahua to Durango and southern Coahuila.

STATE RECORDS.—The breeding Horned Lark of the extreme southwestern part of New Mexico has been referred to *aphrasta*, the range of which lies for the most part in northern Mexico. It was taken May 27, 1892, at Dog Spring, Grant County (Mearns); at Rodeo, April, 1913 (Law and Brooks); and is probably the form found commonly at Apache (Anthony). It is probable that it is for the most part non-migratory.—W. W. COOKE.

SASKATCHEWAN HORNED LARK: *Otócoris alpestris enthýmia* Oberholser

DESCRIPTION.—*Male:* Length (skins), 6.2-6.7 inches, wing 4-4.2, tail 2.6-2.9, bill .4-.5, tarsus .8-.9. *Female:* Length (skins), 5.8-6.1 inches, wing 3.7-4, tail 2.3-2.6, bill .3-.4, tarsus .8. Like *leucolaema* but, in typical cases, paler; above much paler, more pinkish and grayish, eyebrow white, and throat usually very pale yellow.

RANGE.—Breeds in Great Plains region from central Saskatchewan, eastern Montana, and central North Dakota south to central Kansas and northwestern Texas. In winter ranges south to southern Texas, and casually west to New Mexico, Utah, and Arizona.

SWALLOWS: NORTHERN VIOLET-GREEN SWALLOW 453

STATE RECORDS.—A specimen of the Saskatchewan Horned Lark was taken by Batchelder at Las Vegas Hot Springs, at 6,700 feet, December 13, 1882.

SWALLOWS: Family Hirundinidae

Living mainly on aerial insects, the Swallows have broad, flat bills so widely cleft that their mouths open to nearly under the eyes; wings long and pointed, "acute, and thin-bladed, of surpassing volatorial power;" tail emarginate or deeply forked to facilitate rapid turns; and feet short, small and weak with well-curved claws apt for clinging, as they perch or cling when not on the wing.

REFERENCE.—BEAL, F. E. L., U. S. Dept. Agr. Bull. 619, 1918 (food).

NORTHERN VIOLET-GREEN SWALLOW: *Tachycinéta thalássina lépida* Mearns

PLATE 46

DESCRIPTION.—*Male*: Length (skins), 4.2–5 inches, wing 4.3–4.7, tail 1.7–2, bill .2, tarsus .3–.4. *Female*: Length (skins), 4.2–4.5 inches, wing 4.2–4.5, tail 1.7–1.8, bill .2, tarsus .3–.4. Tail emarginate. *Adult male*: Crown and hind neck bronzy green to purplish bronze, nape often with a narrow purplish collar; back and part of wings bronzy green, usually tinged with purple; upper tail coverts violet, shaded with purple, sides of rump with white patches almost confluent; tail and wings black glossed with blue; underparts pure white. *Adult female*: Colors much duller, crown and hind neck varying from brownish to greenish or purplish bronze, and white of anterior underparts often tinged with gray. *Young*: Above sooty brown, back darker, faintly glossed with purple or bronze; underparts grayish white anteriorly (chest tinged with sooty brown), pure white posteriorly, white rump patches as in adults.

COMPARISONS.—In flight, the white underparts suggest the Tree Swallow (p. 456), but when the colors of the upperparts can not be seen, the white rump patches make a distinguishing field character in both young and old.

RANGE.—Breeds from central Alaska, Yukon, southern Alberta, and western South Dakota south to northern Durango and northern half of Lower California; winters in Mexico and south to Guatemala and Costa Rica; migrates through western Texas.

STATE RECORDS.—In the mountains of New Mexico, the Northern Violet-green is the most common breeding swallow and breeds at far higher altitudes than any of the others. Below Pecos Baldy, it was found breeding at 10,300 feet, and in the mountains above Twining was feeding young at 11,300 feet (Bailey). But it also breeds at much lower altitudes, down to 7,000 feet at Fort Wingate (Hollister); to 7,400 feet at Glorieta, to 6,800 feet at Canoncito, July 5, 1903 (Bailey); [6,500 feet, near Santa Fe (Jensen, 1922).] It breeds throughout the State north, south, and east to the Sacramento Mountains (Ligon); Capitan Mountains (Gaut); the Raton Mountains (Coues); and the Sangre de Cristo Mountains (Bailey and Ligon). [In the Sangre de Cristo Mountains it is widely distributed but nowhere abundant (Ligon, 1919).] It is found mostly in the yellow pines and most abundant in the Jemez National Forest. It is very common about Mt. Taylor and in the Black Range. Nesting begins at 8,000 feet on the Gila Forest Reserve, early in June, and it nests generally in June; [on June 12, 1920, four fresh eggs were found in the San Mateo Mountains, 30 miles northeast of Chloride, at 7,000 feet (Ligon)]; but young were still in the nest August 8, 1904, at Amizett in the Sangre de Cristo Mountains (Bailey); and on August 12 at Sawyer in the Zuni Mountains (Dearborn).

By the end of August the species is in full migration southward, and the departure is so rapid that by the middle of September few are left. At Willis, 7,800 feet, on the Pecos most of the birds had left before September 8, 1883, and the rest departed a few days later (Henshaw). They were seen September 10, 1903, at Black Lake, and September 15, 1906, near Laguna (Bailey).

Spring migrants arrive during April: Cooney, April 2, 1889; on the Gila River, at 8,000 feet, April 10, 1913 (Ligon); at Carlisle, April 14, 1890 (Barrell); Willis, April, 14, 1900 (Birtwell). [Several were seen near Albuquerque May 3, 1920 (Ligon). A specimen was taken at Silver City, May 6, 1917 (Kellogg).] Ordinarily all the birds would be at their summer homes before the end of May, but on June 14, 1903, three birds were seen near Montoya, where they presumably do not breed. They had probably been driven down from the mountains by a cold storm (Bailey). [At Lake Burford they were found in flocks the latter part of May, 1918, and after June 7 were fairly common in gulches (Wetmore).]—W. W. COOKE.

NEST.—In cliffs, hollow trees, or old woodpecker holes, and sometimes in a building; lined with grasses and feathers. Eggs: 4 or 5, white.

FOOD.—Insects, practically 100 per cent. Bugs make up over a third of the food, leaf hoppers being the greatest favorite; of 12 families represented, all but one are plant eaters and some do great damage. Wasps and wild bees constitute about a sixth of the food, flies about a fifth, beetles about a tenth (mainly harmful), and ants a little less. While it eats some beneficial parasitic and predatory insects, "it devours an immense number of harmful and annoying insects" (Beal).

GENERAL HABITS.—Seen high in the air in an opening among the conifers, the small Violet-green Swallows, uttering a sharp note, flutter about after insects with a bat-like, hesitating flight, only their white underparts and white rump patches visible; but when entering a nest hole in a cottonwood or aspen, the remarkable violet and green of their backs surprises and delights the eye. One of the most beautiful of western birds, it is always a pleasure to meet them, whether in flocks or at their nests.

At Fort Wingate, where Mr. Hollister found them common in the middle of June, 1905, they were nesting in holes in cliffs near White-throated Swifts. In the gorge of the Rio Grande southwest of Taos at about 7,000 feet, Mr. Ligon found numbers, presumably nesting, June 19, 1919. In the Pecos River Canyon they were found by us from a few miles north of Pecos up to 11,000 feet on Jack Creek, below Pecos Baldy, where a few were seen; but they were most numerous at 8,700 feet, where, on July 19, Mr. Bailey found them breeding in cliffs, and at 10,300 feet, where, on July 25, 1903, we saw them in a grove of poplars on the mesa, busy about their nests in old woodpecker holes, in company with the beautiful Arctic Bluebirds. The interesting birds were found almost everywhere in the mountains above Taos, from 7,400 to 11,400 feet. At 11,400 feet in the amphitheater of Wheeler Peak about August 1, 1904, they were flying around the lake in numbers. At Amizett, an abandoned mining town, on August 8, we were glad to find them flying about a deserted house and to hear



NORTHERN VIOLET-GREEN SWALLOW
FEMALE

MALE

By the end of August the species is in full migration southward, and the departure is so rapid that by the middle of September few are left. At Willis, 7,800 feet, on the Pecos most of the birds had left before September 8, 1883, and the rest departed a few days later (Henshaw). They were seen September 10, 1903, at Black Lake, and September 15, 1906, near Laguna (Bailey).

Spring migrants arrive during April: Cooney, April 2, 1889; on the Gila River, at 8,000 feet, April 10, 1913 (Ligon); at Carlisle, April 14, 1890 (Barrell); Willis, April, 14, 1900 (Birtwell). [Several were seen near Albuquerque May 3, 1920 (Ligon). A specimen was taken at Silver City, May 6, 1917 (Kellogg).] Ordinarily all the birds would be at their summer homes before the end of May, but on June 14, 1903, three birds were seen near Montoya, where they presumably do not breed. They had probably been driven down from the mountains by a cold storm (Bailey). [At Lake Burford they were found in flocks the latter part of May, 1918, and after June 7 were fairly common in gulches (Wetmore).]—W. W. COOKE.

NEST.—In cliffs, hollow trees, or old woodpecker holes, and sometimes in a building; lined with grasses and feathers. *Eggs*: 4 or 5, white.

FOOD.—Insects, practically 100 per cent. Bugs make up over a third of the food, leaf hoppers being the greatest favorite; of 12 families represented, all but one are plant eaters and some do great damage. Wasps and wild bees constitute about a sixth of the food, flies about a fifth, beetles about a tenth (mainly harmful), and ants a little less. While it eats some beneficial parasitic and predatory insects, "it devours an immense number of harmful and annoying insects" (Beal).

GENERAL HABITS.—Seen high in the air in an opening among the conifers, the small Violet-green Swallows, uttering a sharp note, flutter about after insects with a bat-like, hesitating flight, only their white underparts and white rump patches visible; but when entering a nest hole in a cottonwood or aspen, the remarkable violet and green of their backs surprises and delights the eye. One of the most beautiful of western birds, it is always a pleasure to meet them, whether in flocks or at their nests.

At Fort Wingate, where Mr. Hollister found them common in the middle of June, 1905, they were nesting in holes in cliffs near White-throated Swifts. In the gorge of the Rio Grande southwest of Taos at about 7,000 feet, Mr. Ligon found numbers, presumably nesting, June 19, 1919. In the Pecos River Canyon they were found by us from a few miles north of Pecos up to 11,000 feet on Jack Creek, below Pecos Baldy, where a few were seen; but they were most numerous at 8,700 feet, where, on July 19, Mr. Bailey found them breeding in cliffs, and at 10,300 feet, where, on July 25, 1903, we saw them in a grove of poplars on the mesa, busy about their nests in old woodpecker holes, in company with the beautiful Arctic Bluebirds. The interesting birds were found almost everywhere in the mountains above Taos, from 7,400 to 11,400 feet. At 11,400 feet in the amphitheater of Wheeler Peak about August 1, 1904, they were flying around the lake in numbers. At Amizett, an abandoned mining town, on August 8, we were glad to find them flying about a deserted house and to hear



NORTHERN VIOLET-GREEN SWALLOW

FEMALE

MALE

their young calling from inside, for they gave a touch of life and cheer to an otherwise desolate place.

In the Hondo Valley, where there were other kinds of swallows, their shining white underparts and white rump patches set them apart from the rest. They were frequently seen along our way from Hondo Canyon to the Costilla River, being abundant at 9,700 feet on the Costilla, but most of all at 9,400 feet in Costilla Canyon, where they fairly swarmed over the river. They were occasionally noted in 1906 along Santa Clara Canyon in the Jemez Mountains in the yellow pine section, but the main flock was found just below "Sloan Camp" at 7,000 feet, where the creek was wide and quiet and the canyon bottom open. Here, in the early morning of August 21, it was with keen pleasure that I watched them beating back and forth low over a grassy flat by the creek, flying over the stream dipping down for a drink; then rising high above the water to fly about in the sky.

Large numbers were seen by Mr. Gaut flying about the high rock cliffs near the southeast end of the Capitan Mountains from July 16 to 28, 1903. Every morning they traveled a distance of several miles to get water from a tank. In the middle of the day and again at night they would appear at this same tank. Small numbers were found about the high boulders near Tres Piedras early in August, 1904, and several young were seen every day perched on a high dead pine near the boulders, where the old birds brought them food.

In the Zuni Mountains, Major Goldman found the Violet-greens quite common and generally distributed. At McGaffy's Camp in June, 1909, they were seen passing in and out of holes in a tall, dead pine stub close to the barn, and they circled back and forth all day over a small open meadow.

About Santa Fe, Mr. Jensen says, they nest commonly in woodpecker holes in the dead tops of large pines or in a hole in a quaking aspen. In the Santa Fe Canyon, he has found about twenty pairs building in crevices in Monument Rock, a spectacular place, a hundred-and-fifty foot sandstone cliff jutting out from the canyon like a steeple. At an altitude of 7,000 feet, he says they nest from June 1 to June 15, but at 8,000 feet nesting does not commence until some time in July.

On the Upper Pecos, where Mr. Henshaw and Doctor Nelson spent the summer of 1883, "after the young were on the wing, the birds left the pine woods and resorted to the tops of the ridges and the open valleys, where high in mid-air, they were seen busily hunting for insects" (1885, p. 333).

In Oregon, the Violet-green is said to be very partial to nesting boxes. The boxes need to be well out of the reach of cats and firmly attached to a building, and the best form is that made from a small tree trunk. From his experience, Supt. I. R. Alderman of Eugene says

to take a section of trunk, eight inches through and twelve inches long, "saw off from one end a piece two inches long; with brace and bit dig out an opening eight inches long and six inches wide. Then nail on the end sawed off. Make a suitable ventilation at top; bore entrance one inch in size near upper end of cavity" (in Trafton, 1910).

The southward migration of the Northern Violet-green is said to be made in a leisurely manner, nearly a whole day often being spent circling over a pond of water or an alfalfa field, with occasional rests on telephone wires.

TREE SWALLOW: *Iridoprocne bicolor* (Vieillot)

DESCRIPTION.—*Length:* 5-6.2 inches, wing about 4.5-4.8, tail 2.3-2.5. Tail emarginate. *Adult male:* Upperparts steel-blue or steel-green; lores black, tail and wings blackish, slightly lustrous; underparts pure white. *Adult female:* Similar to male and sometimes not distinguishable, but usually duller in color. *Young:* Upperparts and tail dull grayish brown, wings somewhat glossed with greenish; underparts duller white.

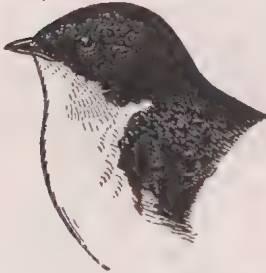


FIG. 76. Tree Swallow

RANGE.—Breeds in Canadian, Transition, and Upper Austral Zones from northwestern Alaska, southern and western Mackenzie, Manitoba, and northern Quebec south to Virginia, Kansas, central-western Texas, Colorado, and southern California; winters from central California, southern Texas, southern parts of Gulf States and North Carolina (casually New Jersey) south over greater part of Mexico to Guatemala and Cuba.

STATE RECORDS.—Breeding from Colorado northward, the Tree Swallow enters New Mexico in fall migration about the middle of August—August 13, 1910, Carlsbad, 3,100 feet (Dearborn), and August 14, 1903, Pecos Baldy, 11,600 feet (Bailey). Migration continues for about a month, and some late dates are: September 14, 1902, at Roswell (Gaut), and September 16, 1900, at Albuquerque (Birtwell).

In the spring migration it enters the State about the middle of April. [It was seen in May, 1916, in the San Francisco Range (Ligon).]—W. W. COOKE.

NEST.—In old woodpecker holes, a hollow tree, or bird box; lined with grasses, leaves, and feathers. *Eggs:* Usually 4 or 5, pure white.

FOOD.—Animal matter, 80.54 per cent, vegetable, 19.46 per cent. The vegetable food is made up of seeds and berries, as cornel, Virginia creeper, and smartweed. The insect food is composed of over 40 species of beetles, most of which are injurious, including small dung beetles, cotton boll weevils, clover weevils, engraver beetles (destructive to pine trees), flea beetles (destructive to cucumbers, potatoes, and other vegetables); and ants, wild bees, wasps, plant lice, leaf and tree hoppers, and chinch bugs (80, evidently from a swarm, in one stomach). Flies make up 40.54 per cent of the total food, the major part house flies, but also horseflies, robber flies, crane flies, and flower flies. "It consumes vast numbers of gnats, flying ants, beetles, mosquitoes, and other flying insects" (Henshaw).

GENERAL HABITS.—The pure white underparts in conjunction with the uniform, glossy upperparts distinguish the Tree, or White-bellied, Swallow when flying low enough for its back to be seen, or when resting

on telephone wires during the migrations. For Mr. Henshaw says, "As is the habit with swallows generally, Tree Swallows migrate by day, feeding as they go, and a flock passing swiftly south presents to the casual observer an every day appearance well calculated to deceive. Watch the flock as it crosses the road and passes from field to field and you will notice that while the line of flight has many a twist and turn it trends steadily to the south, and that no individual takes the back track" (1918, p. 30).

ADDITIONAL LITERATURE.—CHAPMAN, F. M., *Bird Studies with a Camera*, 89-105, 1900.—MILLER, O. T., *Little Brothers of the Air*, 65-68, 1892 (training the young).—WHITTLE, C. L., *Auk*, XLIII, 247-248, 1926 (nesting).—WRIGHT, M. O., *Educational Leaflet 33*, Nat. Assoc. Audubon Soc.

BANK SWALLOW: *Riparia riparia riparia* (Linnaeus)

DESCRIPTION.—*Length*: 4.7-5.5 inches, wing 3.7-4.2, tail 2.1-2.2. Bill very small, tail emarginate, leg with a tuft of feathers near insertion of hind toe. *Adults*: Upperparts grayish brown, darkest on head and wings; underparts white with a broad sooty brown band across chest and sides. *Young*: Similar, but rump and wings with brownish buff edgings, and chest band with paler tips, throat often speckled and underparts sometimes tinged with brown.

RANGE.—In North America breeds in Boreal, Transition, and Austral Zones from near the limit of trees in northern Alaska and northern Ungava south to Virginia, Louisiana, Texas, Arizona (rarely), and southern California; migrates through Mexico and Central America (casually West Indies), and winters in South America in Brazil and Peru.

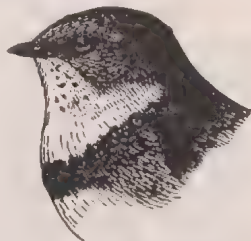


FIG. 77. Bank Swallow

STATE RECORDS.—The records of the Bank Swallow in New Mexico are in a very unsatisfactory condition. One was taken near Carlsbad, September 3, 1901 (Bailey); and one at Mesilla in July, 1913, while others were seen in the Burro Mountains in June, 1916 (Merrill); but most of the records of the Bank Swallow belong really to the Rough-wing, and it seems probable that the Rough-wing is more common in New Mexico than the Bank. [Jensen, however, reports a large colony of Bank Swallows nesting in Santa Clara Canyon in the Jemez Mountains (1922). Ligon has found nests along the Verde River in Arizona, and also on the Pecos River in Texas just outside the State, and feels confident that nests will be found on the Pecos in New Mexico (1916-1918).]—W. W. COOKE.

NEST.—In horizontal holes or burrows, excavated in sand banks, cuts, and banks of streams. *Eggs*: 3 to 6, white.

FOOD.—Practically wholly insects, with a few spiders. Among other insects are the rice weevils (destructive to stored grain), cotton boll weevils, alfalfa weevils, flea beetles (injurious to garden truck), winged ants, leaf and tree hoppers, plant lice, and May flies. About a quarter of the food consists of houseflies and crane flies.

GENERAL HABITS.—The dingy little Bank Swallow with the dark chest band, like other swallows nests in colonies, but unlike them excavates burrows in cut banks or river banks in which to safely rear its family. Sometimes, even here, its young are threatened by a strange enemy, a badger, which digs down to the burrows from above.

That the Swallows return to the same general region to nest is suggested by some banding experiments made by Dayton Stoner. Only one bird was re-taken in the burrow from which it was banded, but one was recovered about fifty yards away, where it had a family of young in the nest (1928, p. 45).

In one of the colonies of Bank Swallows studied by Mr. Stoner, "in practically all the burrows examined, the outer one-third to one-quarter was somewhat lower than the terminal two-thirds or three-fourths." The slight ascent had the advantage of preventing slanting rain from washing in too far, and flying enemies like hawks from easily seeing the young while waiting near the mouth of the burrow for food.

During migration, at Mesilla Park, Professor Merrill wrote, "This small traveler arrives about the same time the other swallows do, flocks with them, though they are not quite as numerous perhaps, and departs with them" (MS).

Like other swallows the Banks migrate in great flocks, collecting in roosts at night. In North Dakota during an August migration, I was fortunate enough to be on their route. A flock gathered at the Sweetwater Lakes, increasing day by day till it was between nine hundred and a thousand strong. Then at sundown, from the telephone wires on which the birds had collected, long sections would suddenly drop from the wires and flying high over the wheatfields to the lake pitch down into the tules, where they could find safe harbor for the night. After this great flock had gone on to the south, a smaller flock of perhaps three hundred appeared on the wires, but toward night, instead of flying to the lake, they flew up into the sky, to my amazement rising higher and higher till they actually went out of sight in the sky—a winged host translated (1920, pp. 23-25). It was an experience of a lifetime.

ADDITIONAL LITERATURE.—SETON, E. T., *Bird-Lore*, XXII, 334-335, 1920 (sun baths, etc.).—STONER, D., *Auk*, XLII, 86-94, 1925; XLIII, 198-213, 1926 (colonies, nests, and banding).

ROUGH-WINGED SWALLOW: *Stelgidópteryx serripennis* (Audubon)

DESCRIPTION.—*Length*: 5-5.7 inches, wing 4-4.7, tail 2-2.3. Bill small, tail short, slightly emarginate, *outer web of outer primary saw-toothed* in male, roughened in female. *Adults*: Upperparts plain grayish brown, darker on head, wings, and tail; anterior underparts pale grayish brown, posterior underparts white. *Young in juvenal plumage*: Similar to adults but more or less washed with rusty, wings with broad cinnamon tips and margins; throat and breast almost cinnamon.

COMPARISONS.—The only adult New Mexico swallows with brown backs, the Rough-winged and the Bank, are easily distinguished—the Rough-winged, by its plain brownish underparts, the Bank by its white underparts crossed by a brown chest band. "The adult Rough-winged somewhat resembles a young Tree Swallow in general coloration but is duskier below, especially on the breast" (Chapman). (See p. 456).

RANGE.—Breeds in Transition, Austral, and Tropical Zones from southern British Columbia, Montana, North Dakota, Wisconsin, Ontario, and Massachusetts south to southern United States—from Florida to southern California—and to Vera Cruz and Jalisco, Mexico; winters from central Mexico south to Central America, and Costa Rica; casual in Manitoba.

STATE RECORDS.—The Rough-winged Swallow was found breeding quite commonly at Zuni, the summer of 1873 (Henshaw), and specimens were collected. It is fair to presume that this is the bird which Doctor Coues records as an abundant breeder at this same place and which he called the Bank Swallow. The Rough-winged also breeds near Shiprock, 1907, and in the neighboring parts of Colorado (Gilman); it breeds just over the New Mexico line at Trinidad, Colorado, and undoubtedly breeds locally across northern New Mexico. [At Lake Burford one pair and a few others were noted between May 23 and June 9, 1918 (Wetmore.)]—W. W. COOKE.



FIG. 78. Rough-winged Swallow

NEST.—In holes or crevices, in masonry and often in abutments of bridges; lined with dry leaves, grass stems, and twigs. *Eggs*: 3 to 6, white.

FOOD.—Flies are the favorite food, amounting to nearly a third. Among the insects of interest are ants, tree and leaf hoppers, alfalfa weevils, cotton boll weevils, rice weevils, engraver beetles, and flea beetles.

GENERAL HABITS.—The gray-breasted, earth-colored Rough-wing does not live in such large colonies as the other swallows, five or six pairs or even a single pair frequently breeding by themselves, although in migration they collect in large flocks. As a rule they do not excavate their own burrows but use natural cavities, holes in masonry, or as Mr. Tyler finds, holes dug by some of the smaller mammals. If these are chosen, he says, "before occupancy they are thoroughly renovated, as is evidenced by the small mounds of dust, leaves, and trash that are to be seen below the entrance to occupied cavities." The nests are placed "from two to four feet from the entrance, and often several inches above the mouth of the excavation, so there is no possibility of even a driving rain entering their tunnel" (1913, p. 93).

AMERICAN BARN SWALLOW: *Hirundo erythrogaster* Boddaert

DESCRIPTION.—*Length*: 5.7–7.7 inches, wing 4.6–4.9, tail 3.7–4.1, in adult male forked for about 1.8–2.1 inches. *Adult male*: Forehead and underparts tawny brown, paler posteriorly; upperparts glossy steel-blue, with partial collar of the same; tail and wings dusky, faintly glossed with greenish, forked tail with all but middle feathers with white spots; wing coverts and tertials broadly margined with steel-blue. *Adult female*: Similar but underparts usually paler and outer tail feathers sometimes shorter. *Young*: Much duller, crown and hind-neck sooty black, with less gloss than on back; forehead dull light brownish or buffy; throat pinkish cinnamon.

RANGE.—Breeds from northwestern Alaska, northern Mackenzie, southern Manitoba, and central Quebec south to North Carolina, northern Arkansas, southern Texas (west of 97°), Guanajuato, Jalisco, Tepic; migrates through Bahamas and

West Indies and winters from southern Mexico through Central and South America to Brazil, northern Argentina, and central Chile.

STATE RECORDS.—Few birds have a wider distribution in New Mexico during the breeding season than the Barn Swallow. It seems to be equally at home in the val-



From Biological Survey

FIG. 79. Barn Swallow

leys, on the plains, and in the mountains, wherever buildings furnish its favorite nesting sites. It nests up to an altitude of 7,000 feet at Taos (Bailey); to the same altitude at Fort Wingate (Fisher); and to 8,000 feet at Halls Peak (Barber); it also nests in the lowest and hottest parts of the State, as at Mesilla, 3,800 feet (Merrill); and Carlsbad, 3,100 feet (Bailey). It was nesting May 5, 1909, at Deming (Rockhill); was beginning to build May 20, 1903, at Santa Rosa, and was still feeding young out of the nest, August 9, 1904, at 8,200 feet along the Hondo (Bailey). [In Santa Fe, where it is common, fresh sets are found June 1–July 1 (Jensen, 1923). It was common June 16–21, 1918, in the Pecos Valley, from Roswell to Fort Sumner, nesting about buildings (Ligon).]

In the fall migration, it is one of the later swallows to remain in the State; it was common on the Pecos, at 7,200 feet and around old Bernal and Tecolote, August 28, 1903 (Bailey); a few were seen at Cimarron, August 29, 1913 (Kalmbach); and it is still common in September, though the bulk leave the latter part of that month. It

was still present September 30, 1902, at Santa Rosa (Gaut); one was seen September 29, 1906, at Punta Malpais (Bailey); [one was seen, October 3, 1916, at Zuni (Skinner)]; and the last was seen October 5, 1913, at Mesilla (Merrill); and October 13, 1907, near the head of the Mimbres (Bergtold).

The first was seen at State College in 1915 on April 2 (Merrill); at Chloride in 1914 on April 3 (Ligon); at Albuquerque in 1914 on April 5 (Morley); at Silver City in 1884 on April 7 (Marsh); at East Las Vegas, April 20, 1902 (Atkins); and at Santa Fe, May 6, 1903 (Merriam).—W. W. COOKE.

NEST.—A wall pocket made of pellets of mud mixed with straws or long horse-hairs and lined with feathers, attached to the wall of a cave or to timbers in barns or other buildings. *Eggs:* 3 to 5, white, speckled with brown and lavender.

FOOD.—Almost wholly insects, including cotton boll weevils, rice weevils, about 80 species of beetles, most of them harmful and some exceedingly so, ants (one stomach contained about 1,000), leaf bugs and hoppers, plant lice, and chinch bugs. Flies make up more than one-third of the total food, most of them related to the house fly; but they also eat craneflies, horseflies, and robber flies, which are said to destroy honey bees.

GENERAL HABITS.—The familiar and useful Barn Swallow with its steel-blue upperparts and tawny underparts, is often seen circling about

over the fields with the marvelously rapid, graceful flight made possible by its long slender wings and deeply forked tail; at other times it is heard twittering softly on roadside telephone wires to which its tiny feet hold fast; or is found making itself at home about friendly adobes and in Mexican villages. A pair that Mr. Ligon found on the Chama River were nesting in an occupied adobe, both families using the same doorway. In the Pecos Valley, he writes, "I noticed that these Swallows often play along by the side of a flying auto, following it far out in the open country, and dipping back and forth, catching insects disturbed by the car."

At Roswell, Mr. Bailey found a nest of nearly full grown young under the porch of the Central Hotel just above the heads of people constantly passing on the sidewalk, and instead of showing fear the young birds would open their mouths when spoken to. Most remarkable of all, a nesting colony was found on the piazzas of the Harvey House, the depot hotel of Deming. Two tiers of piazzas ran the full length of the long building on north and south sides, and their rafters afforded unusual nesting opportunities. These the Swallows took advantage of in spite of the fact that the piazzas were paralleled on one side by the Santa Fe tracks and on the other by the Southern Pacific tracks and that trains were constantly shifting back and forth, overlands thundering in, bells ringing, and engines puffing up great clouds of steam and smoke! But popular prejudice pursued the poor birds even here, and regardless of their good offices in destroying multitudes of flies and other insects that would have annoyed the passerby, at our first visit so many of their nests had been thrown down that it was impossible to tell the size of the original colony. At our second visit, while the hotel boys with long sticks were knocking down many of the old nests, the Swallows, compelled by their strong home instinct, were actually building new ones.

In striking contrast to this railroad nesting site was one of a pair Mr. Ligon found completing their nest inside the dark recesses of an old dugout! Another pair that preferred peace and quietness to clamor was seen feeding its young on a rock on the bank of the tranquil Pecos. Still another pair had a nest under a wharf at Coronado, California, Mr. Gander relates. Frightened by the too close approach of interested bathers, one of the nestlings jumped out and fell into the water. But it quickly swam to one of the wharf pilings, where it clung to a bunch of barnacles. Splashed by every wave, it was in need of help, and was finally rescued by two Boy Scouts, who, "after much effort, succeeded in placing it near the nest on one of the girders" (1927, p. 574).

In the fall migration, on August 11, 1904, in going down from the mountains into the Hondo Valley, we found Barn Swallows flying high over the cultivated fields in company with Cliff and Tree Swallows.

Between Santa Rosa and Roswell, Mr. Gaut saw Barn Swallows every day from September 19 to 28, 1902, and wrote, "This beautiful little swallow is, without doubt, the most common bird next to the Horned Lark on the prairie in the Pecos Valley" (MS). It was also common about Roswell, where large numbers were seen mingled with White-bellied Swallows.

At Mesilla Park in the spring migration, it arrives about May 1, Professor Merrill states, and often "raises two broods, the second brood not coming from the nest until after mid-August. Great flocks gather after the first of August and disappear to the south in late September and October. Flocks formed of the Barn, Cliff, and Bank Swallows are so large sometimes as to fill three telephone or telegraph wires for a distance of thirty rods. One wonders where they all could have come from" (MS).

ADDITIONAL LITERATURE.—MILLER, O. T., With the Birds in Maine, 131-141 1904.—WRIGHT, M. O., Educational Leaflet 32, Nat. Assoc. Audubon Soc.

CLIFF SWALLOW: *Petrochelidon albifrons albifrons* (Rafinesque)

DESCRIPTION.—*Male*: Length (skins) 4.8-5.3 inches, wing 4.1-4.5, tail 1.8-2.1, bill .2-.3, tarsus .4-.5. *Female*: Length (skins) 4.7-5.3 inches, wing 4-4.3, tail 1.8-2, bill .2-.3, tarsus .4-.5. *Adults*: Forehead cream color; crown, back, and chest patch glossy steel-blue, the back streaked with grayish or whitish; chin, cheeks, and collar chestnut, rump conspicuous cinnamon-rufous; wings and tail dusky, with a greenish gloss; chest and sides pale grayish brown, rest of underparts whitish. *Young*: Similar, but forehead brown, crown and back brownish.

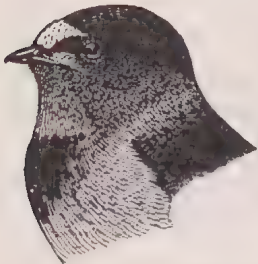


FIG. 80. Cliff Swallow

COMPARISONS.—The rufous upper tail coverts of the various forms of the Cliff Swallow distinguish it from all other swallows. The three forms of the Cliff may be distinguished by their range in the breeding season; at other times by size, the Cliff being the largest of the three; also by the color of the forehead, which in the Cliff is cream color; in the Lesser Cliff, yellowish brown; and in the Mexican, chestnut like the throat. (See p. 465.)

RANGE.—Breeds from central Alaska, Mackenzie, northern Ontario, and central Quebec south to Virginia, northern Texas, northern New Mexico, Arizona and Lower California; migrates through Central America and winters in Brazil, northern Argentina, and central Chile.

REMARKS.—The winter ranges of the three New Mexico forms of Cliff Swallow have not been worked out, but they probably all go to South America.

STATE RECORDS.—One of the most abundant breeding birds in New Mexico, the Cliff Swallow occurs throughout the northern part of the State and south at least to 7,000 feet near Pecos; Taos, 7,000 feet (Bailey); Tres Piedras, 8,000 feet (Gaut); and Halls Peak, 8,000 feet (Barber). It also breeds as low as 5,000 feet at Shiprock (Gilman); Santa Rosa, 4,600 feet (Weller); and Los Pinos, 4,900 feet (Coues). [At Lake Burford in 1918, it was common from May 26, when a flock of 25 appeared,

but building did not begin until June 9 (Wetmore).] At Tres Piedras young were still in the nest August 3, 1904 (Gaut). A few were seen August 6 about the Maxwell reservoir, Colfax County (Kalmbach).

In the fall, the larger part have left the State by the last of August; Costilla, 8,500 feet, August 25, 1904, and near Las Vegas, August 31, 1903 (Bailey).
—W. W. COOKE.

NEST.—A gourd or retort-shaped structure made of pellets of mud mixed with a few straws, lined with feathers; attached to cliffs or buildings. *Eggs:* 3 to 5, white, speckled or spotted with brown and lilac.

FOOD.—Almost wholly insects, with a few spiders, the insects including leaf bugs, leaf hoppers, ants, wasps, golden green flesh flies, and some of our worst insect pests, as the boll weevil, alfalfa weevil, and the chinch bug, which destroys millions of dollars worth of wheat. Thirty-five stomachs from Texas all contained cotton-boll weevils, averaging 18 each, the majority containing nothing else; so that it may be conservatively estimated that Cliff Swallows, during the fall migration, would destroy more than one million of these destructive insects in a week in one Texas County (Howell).



From Biological Survey

FIG. 81. Purple Martin and Young Cliff Swallows

GENERAL HABITS.—Like the other swallows, the Cliff Swallow is gregarious, its colonies sometimes containing hundreds of birds. In New Mexico, in the region of eroded sandstone cliffs, under a projecting roof of rock we sometimes found a colony of nests set so close together that they gave the effect of a ceiling of adobe gourds. Near Santa Fe, Mr. Jensen has found a colony of about a hundred and fifty pairs on the sandstone cliffs near La Bajada Hill, and another large colony on a cliff facing the Rio Grande near the Cochiti Indian Pueblo. But while the Swallow still maintains its ancient custom of nesting on cliffs in uninhabited country, in inhabited sections it nests commonly in rows under the eaves of barns. In the Santa Fe region Mr. Jensen has often found it nesting under the cornices of buildings. At Tres Piedras, where the people call it a "mud dauber," Mr. Gaut found it abundant

about the houses, and several nests containing young nearly ready to fly were seen about the main store of the village.

The extent of the service the swallows render in destroying injurious or annoying insects may be suggested by the fact that a colony of



MAP 30. CLIFF SWALLOWS

1. Cliff Swallow 2. Lesser Cliff Swallow 3. Mexican Cliff Swallow

Shaded areas show general breeding ranges. Triangles mark regional breeding or breeding season records

about eight hundred studied by Mr. Storer had a "forage range" of a radius of two miles (1927, p. 107).

The belief that the birds harbor "parasites which the good house-keeper fears" is erroneous, their parasites being of a different species from the one that afflicts mankind, and one which will live only on birds. In order to obtain their services in destroying insect pests, as

they can not fasten their nests to a smooth painted surface, rough board or cement surfaces should be provided under the eaves of barns.

At Lake Burford, where Doctor Wetmore found the Cliff Swallows nesting under cliffs, he watched the skilled masons coming to the shore of the lake for building mud. Their method of "procuring material for their adobe structures" has been delightfully described by Olive Thorne Miller in *Upon the Tree-Tops*, where she says—"It was when a recent shower had left little puddles in the clay road . . . most daintily they alighted on their tiny feet around the edge, holding up their tails like wrens lest they should soil a feather of their plumage, and raising both wings over their backs like butterflies, fluttering them all the time as if to keep their balance and partly hold them up from the ground—a lovely sight" (1897, p. 32).

LESSER CLIFF SWALLOW: *Petrochelidon albifrons tachina* Oberholser

DESCRIPTION.—*Male:* Length (skins) 4.1–4.8 inches, wing 4–4.1, tail 1.7–1.8, bill .3, tarsus .4–.5. *Female:* Length (skins) 4.8 inches, wing 4.1, tail 1.9, bill .3, tarsus .4. Similar to the Cliff Swallow but decidedly smaller, the forehead ochraceous instead of cream-color.

RANGE.—Southeastern New Mexico and central-southern Texas, south through Rio Grande Valley and eastern Mexico at least as far as Vera Cruz; winter home unknown; migrates through Costa Rica and Panama.

STATE RECORDS.—The form of the Cliff Swallow breeding in the lower Rio Grande Valley in Texas and in eastern Mexico has been separated under the name *tachina*. It is an abundant breeder along the lower Rio Grande of Texas, and extends its range at least to southeastern New Mexico, where specimens were collected June 19, 1913, at 6,800 feet on the Penasco River, near Mayhill, from a colony of about 500 nests (Ligon). It breeds abundantly at Carlsbad (Bailey), and the breeding range is undoubtedly continuous from the Penasco down the Pecos to the Rio Grande. It was found by Bailey "common all along the Pecos Valley from Roswell to Carlsbad, and around the Capitan Mountains. It was breeding on suitable cliffs and under the eaves of buildings in the towns." There was a bunch of nests under a low limestone cliff near Portales, June, 1899 (MS). At Carlsbad, August, 1910, Dearborn found it common and "breeding under the arches of the flume where it crosses the Pecos River" (MS).—W. W. COOKE.

MEXICAN CLIFF SWALLOW: *Petrochelidon albifrons melanogastrea* (Swainson)

DESCRIPTION.—*Male:* Length (skins) 4.4–5.6 inches, wing 4–4.2, tail 1.7–2, bill .2–.3, tarsus .4–.5. *Female:* Length (skins) 4.7 inches, wing 4.1, tail 1.8–1.9, bill .3, tarsus .5. Like the Cliff Swallow but "smaller, with forehead chestnut like throat, and side of head (rarely fawn-colored) and rump deep cinnamon" (Ridgway).

RANGE.—Breeds in southern Arizona and southwestern New Mexico south over Mexican tableland to Guatemala; winter home unknown.

STATE RECORDS.—The form of the Cliff Swallow breeding in southwestern New Mexico is the same as that in southern Arizona and southward, which has been separated under the name of the Mexican Cliff Swallow. It is a common breeder at Mesilla Park (Merrill). It ranges at least as far north as Palomas Springs, in the Rio Grande Valley (one was taken May 9, 1913, at about 4,300 feet) and at least 6,600 feet in the Gila Valley on the East Gila River. [Great numbers nest in cliffs

near Palomas Springs, and on Cuchillo Creek, 15 miles west of Cuchillo, to about 5,200 feet. Many fresh eggs were found, May 25, 1916 (Ligon).] On the East Gila River they arrived April 1, 1913, and nested abundantly for miles along the cliffs of Beaver Creek. At State College they arrived April 4, 1915. The last noted in 1913, at Mesilla, was on October 1 (Merrill).—W. W. COOKE.

GENERAL HABITS.—Near Palomas Springs, in 1913, Mr. Ligon found two large colonies of Mexican Cliff Swallows. As he explains, "The high steep hill here breaks off abruptly at the river and the water has cut into the concrete side leaving a hanging point at two places where the birds nest." Two hundred yards below is another colony. "These nests are difficult to get at, as a full river washes the bank swiftly, underneath. There were about five hundred birds, which had just begun to lay. The nests that contained eggs were old nests, some having been slightly repaired. Above these a little way, the birds were busy building new nests, getting mud just across the river opposite. The nesting material used in addition to the mud was very scant, just a few grass blades and mesquite leaves. The nests had an average length of seven inches, and the entrance was one and three-fourths inches in diameter. The cavity inside was rather large and almost round; the entrance to the nest dropped down." Three years later on revisiting the place Mr. Ligon found that "the upper colony was composed of about four hundred and fifty occupied nests extending for a distance of a hundred feet." The colony two hundred yards below contained a hundred occupied nests.

On the Gila Reserve, one mile below V+T Headquarter Ranch on June 6, 1913, he found a smaller nesting colony. "There were sixty occupied nests in one group," he reported, "clustered under one protecting rock about thirty feet up on the side of a canyon. They were all old nests, being reoccupied. Above the V+T Ranch, about three miles, was another great breeding site. Here also most of the old nests were being used, on account, I believe, of a dry summer, there being no mud nearer than a mile. For miles up the east Gila and along Haut Creek one was hardly out of sight of nesting birds. Many here were using old half-wrecked nests, while as many more were building new nests" (MS).

At Silver City, the Beaver Lake Reserve, and the East Fork of the Gila, the Mexican Cliff Swallows were noted by Mr. Birdseye. At Beaver Lake, in 1908, they had been breeding by hundreds in some cliffs near the lake.

At Mesilla Park, Professor Merrill reports that Cliff Swallows (probably the Mexican) come about May 1, nest from June nearly through July, begin to gather in huge flocks with the Barn and Bank Swallows in early August, and leave with them late in September or early in October. They form large colonies and place their jug-like nests in

buildings under eaves and rafters. They eat great quantities of insects (MS).

PURPLE MARTIN: *Prógne súbis súbis* (Linnaeus)

DESCRIPTION.—*Male*: Length (skins) 6.7–8 inches, wing 5.5–6, tail 2.7–3.1, bill .4–.5, tarsus .6–.7. *Female*: Length (skins) 6.7–7.9 inches, wing 5.3–5.8, tail 2.7–3 (forked for .7–.9), bill .4–.5, tarsus .6–.7. *Adult male*: Uniform *glossy violet or steel-blue* (feathers gray and black beneath the surface); tail and wings dull black, scapulars like body. *Adult female and young*: Forehead and collar grayish, rest of upperparts duller and less uniform than in the male, the gray bases of feathers showing through; tail and wings black; throat, breast, and sides grayish, more or less tipped with white, giving scaled effect; rest of underparts white or pale grayish, usually more or less streaked.

RANGE.—Breeds from Idaho, Montana, Manitoba, northwestern Ontario, New Brunswick, and Nova Scotia south to southern Florida, Vera Cruz, and Tepic; migrates through Central America and northern South America, and winters in Brazil.

STATE RECORDS.—Throughout New Mexico the Purple Martin is a well known and fairly common breeder, nesting mainly in Transition Zone from as high as 9,000 feet at Clouderoft (Bailey); down to at least 8,200 feet in Socorro County (Ligon); to 8,000 feet in the Capitan Mountains (Gaut); at Tres Piedras (Loring); and to the head of the Rio Mimbres at 6,500 feet (Bailey). [A specimen was taken June 6, 1917, at Silver City (Kellogg).] A few also breed in the valleys down to Mesilla Park, 3,800 feet (Merrill); and [one record] at Roswell, 3,500 feet (Bailey). The nest near Mesilla Park was found by Merrill on May 26, 1913, and young were being fed in a nest found by Gaut in the Capitan Mountains the middle of July, 1903. [About Mount Taylor it is common, nesting in July and August (Ligon, 1916–1918).]

It is one of the earliest migrants to complete its departure from the State, only stragglers being left after the first week in August; Guadalupe Mountains, August 4, 1901 (Bailey); Mescalero, August 12, 1898 (Barber); and Sawyer, about August 6, 1911 (Dearborn); exceptionally late birds were seen at Beaver Lake, August 27, 1908 (Birdseye).

The first returning migrants were noted in 1913 on April 18, at 8,000 feet in Socorro County; at Chloride May 1, 1914, and April 28 and 30, 1915 (Ligon). [At Lake Burford, migrants were observed on June 8, 9, and 13, 1918 (Wetmore).]—W. W. COOKE.

NEST.—In holes in trees, including giant cactus, or about buildings and in bird boxes. *Eggs*: 3 to 5, plain white.

FOOD.—Wholly insects and a few spiders. More than three-fourths consist of wasps, bugs, and beetles (including several species of harmful weevils, as the cloverleaf, nut, and cotton boll weevil). Besides these there are many crane flies, moths, May flies, dragon flies, and ants. "A quart of wing covers of cucumber beetles were found in one Martin nesting box" (Attwater).

GENERAL HABITS.—In New Mexico the Purple Martins have been found by Mr. Ligon in heavy pine timber in the mountains, nesting in old woodpecker holes, frequently in dead pines. On the Mimbres, Mr. Bailey found numbers of them nesting in this way, sometimes several families living in one tree. They seemed to prefer lone trees with the bark off, especially where the holes were high. In the Capitan Mountains, Mr. Gaut also found them nesting in dead trees. Four

pairs were living in one tree. Food was being carried in to the young the middle of July.

As the country becomes settled, the social Purple Martins, attracted perhaps by the unfailing supply of insects, come to live about houses, gladly accepting the offer of old gourds hung from dead trees or poles



MAP 31. PURPLE MARTIN

Triangles mark breeding and breeding season records, mainly in Transition Zone

to nest in, but preferring apartment houses where a number of families can enjoy each other's society. "Any kind of a weather-tight box or barrel, however rude," Mr. Henshaw says, "when divided into compartments answers their needs as well as the most costly and ornamental house." But the rooms should be four and a half inches wide, seven inches high, and eight inches deep, with entrance hole about two and a half inches across; and the house should be fifteen or

twenty feet from the ground, with a flaring tin collar to protect it from prowling cats. Some interesting experiments have been tried in the effort to establish Martin colonies in new localities, the best way apparently being to secure nestlings, as they can be successfully raised by hand. Wherever they can be induced to nest, they will not only drive off all marauding crows and hawks, but their sociable chatter and interesting communal life will afford endless entertainment for their favored hosts.

On their fall migrations the Purple Martins, like other swallows, gather in large numbers in some suitable locality to roost. In the city of Washington—in which a nesting colony for a time occupied a house near the Capitol—in August, 1918, as many as 35,000 Martins were estimated in a roost covering thirteen trees bordering the sidewalk opposite the Red Cross Building.

On July 25, when they had settled down for the night, they were disturbed by a thunderstorm. As the night superintendent of the Red Cross Building reported, after every brilliant flash of lightning followed by heavy thunder they rushed from the trees in great clouds, flew wildly about for a short time, and then settled into the roost again.

Since 1918, the Martins have changed their roost several times, but for a term of years have occupied the elms over the New Jersey Avenue car tracks, in some seasons during the whole of July and August and the early part of September, their maximum numbers being estimated as forty thousand.

ADDITIONAL LITERATURE.—DEARBORN, NED, U. S. Dept. Agr., Farmers' Bull. 609, 1914 (bird houses).—DUTCHER, WILLIAM, Educational Leaflet 13, Nat. Assoc. Audubon Soc.—FINLEY, W. L., and I., Condor, XXVI, 6-9, 1924 (changing habits).—HENSHAW, H. W., Biol. Surv., U. S. Dept. Agr., Circ. 57, 1907 (eating cotton boll weevils).—HOWELL, A. H., Biol. Surv., U. S. Dept. Agr., Bull. 29, 9-11, 1907.—JACOBS, J. W., The Story of a Martin Colony, 1906 (methods of attracting, etc.).—MCATEE, W. L., U. S. Dept. Agr. Bull. 715, 1918 (attracting birds).—MCCONNELL, T. L., Bird-Lore, XXIII, 75-77, 1921 (houses).—OBERHOLSER, H. C., Bird-Lore, XIX, 315-317, 1917; XXI, 96-99, 1919; XXIV, 351, 1922; XXVI, 416, 1924 (Washington roosts).—STUART, F. A., Bird-Lore, XXI, 92-95, 1919.—TAVERNER, P. A., Wilson Bull., XVIII, 87-92, 1906 (roost).—TRAFTON, G. H., Methods of Attracting Birds, 14, 22, 32-40, 1910.—WHITNEY, T. H., Wilson Bull., XXXVII, 65-72, 1925 (houses).—ZIEGLER, G. F., Jr., Auk, XL, 431-436, 1923.

MAGPIES, JAYS, CROWS, etc.: Family Corvidae

Our Corvidae are large, strongly marked birds with stout bills and feet, nostrils densely covered with long tufts of close pressed bristly feathers (except in Pinyon Jay) and wings equalling or much shorter than tail, both rounded; the wings with ten fully developed primaries.

MAGPIES AND JAYS: Subfamily Garrulinae

ROCKY MOUNTAIN CANADA JAY: *Perisoreus canadensis capitalis* Ridgway

DESCRIPTION.—*Length*: About 11.2-13 inches, wing 5.9-6.3, tail 5.8-6.3, bill .9-1, tarsus 1.3-1.4. Head uncrested; *plumage soft, full and lax*; bill short, tail graduated. *Adults*: Head white, with slaty gray patch on back of neck; collar white; rest of upper-



FIG. 82.—Rocky Mountain Canada Jay

At a camp at the base of Pecos Baldy, at 11,600 feet elevation, the friendly "camp birds" joined the naturalists at their meals under the firs and spruces

parts leaden gray, except blackish tail and wings; tail with white tips, and wings with whitish edgings; *throat and breast whitish*; *rest of underparts brownish gray*. *Young*: Almost uniformly slaty or brownish, top of head dull whitish tinged with grayish brown, tail as in adults; feathers of underparts more or less tipped with whitish.

COMPARISONS.—While no hard and fast lines bound the breeding grounds of the four genera of jays found in the Rocky Mountains of New Mexico, the short-tailed grayish blue Pinyon Jay belongs to the pinyon pines of Upper Sonoran Zone, the longer tailed round-headed light blue Arizona and Woodhouse Jays belong in the nut pines, junipers, and oaks of the Upper Sonoran Zone; and the dark, Long-crested Jay in the yellow pines and firs and spruces of the Transition and Canadian Zones, while the big, fluffy, gray Rocky Mountain Jay, or Camp Bird, belongs among the hemlocks and spruces of the Hudsonian Zone.

RANGE.—Resident in Boreal Zones of Rocky Mountain region from interior of southern British Columbia, southern Alberta, and western Montana south to northern New Mexico and central-eastern Arizona.

STATE RECORDS.—From their home in the northern part of the Rocky Mountains, a few Rocky Mountain Jays extend their range into the highest mountains of north-central New Mexico. No nests have been reported from New Mexico, and the altitude at which the actual nesting occurs is not yet known. Judged by its



MAP 32. ROCKY MOUNTAIN CANADA JAY

Shaded areas show summer range. Triangles mark summer records

behavior in Colorado, the bird should nest in April and May at about 10,000–11,000 feet [In the Sangre de Cristos it is most common about 10,000 feet, never below 9,000, and then only adjacent to higher regions. On June 29, 1919, adults with hardly distinguishable young were seen near the head of Santa Barbara River, 20 miles north of Cowles, at about 12,000 feet (Ligon).] In 1903 around Pecos Baldy they were not noted until July 23 (Bailey), when, at 11,000 feet on Jack Creek, the young were full grown but still accompanying their parents. [On June 12, 1919, they were observed at 9,000 feet on Pecos River. In June, 1924, they were observed in limited numbers on heavily timbered slopes southeast of Wheeler Peak, from timberline down to 10,000 feet (Ligon). On June 27, 1922, two were seen in the

Sangre de Cristo Mountains at 11,500 feet (Jensen).] One was seen May 9, 1900, as low as 7,800 feet at Willis (Birtwell). [On a hill near Lake Burford, one was seen June 16, 1918 (Wetmore).] In 1904, in Wheeler Peak amphitheater at 11,400 feet, the young were nearly full grown July 20, but were still being fed by the parents on July 26. They were common at 11,600 feet at the foot of Pecos Baldy after August 7, 1903 (Bailey); but they may have nested several hundred feet lower and gone up after the young were well grown.

During the fall, this species has been noted on the crest of the San Juan Mountains at Hopewell, September 8, 1904, at 9,900 feet (Gaut); in Costilla Pass at 10,000 feet, September 26, 1903 (Howell); and at 9,500 feet in the Gallinas Mountains October 6, 1904 (Bailey). The 9,500-foot record probably represents about the lower limit of the range in the fall and winter, while the birds seen July 13-18, 1910, near the base of Lake Peak, 15 miles northeast of Santa Fe, were at the most southern recorded locality.—W. W. COOKE.

NEST.—Usually on a branch of a spruce or other conifer, large and substantial, made of twigs, grasses, mosses, plant down, and feathers. *Eggs*: 3 to 4, varying widely in size and coloration from yellowish gray to pale green, finely dotted and blotched with brown and slate, or lavender, especially about the larger end; others more uniformly and largely blotched.

FOOD.—Wild fruits, including elderberry, bearberry, sumac, and viburnum; also scattered grain in corrals; insects, especially grasshoppers and caterpillars; small mammals, meat, and camp food.

GENERAL HABITS.—As Mr. Ligon says, the habit of the Rocky Mountain Canada Jay, found in the hemlocks and spruces, is to go 'quietly about investigating, constantly foraging, apparently regarding the presence of man no more than a tree or snag.' When we first camped at the foot of Pecos Baldy, at 11,600 feet, in Hudsonian Zone, the friendly birds flocked around us, delighting us by flying fearlessly down around our table to be fed. The second morning, to our distress, one was found accidentally caught in a trap set back under some spruces that it might escape discovery. As only one foot was hurt he was freed, but the accident seemed to make a difference in the number that came, only one or two being seen at a time after that. They were made so welcome that they came frequently, however, and surely at meals—the cook said they woke him up in the morning, they were in such a hurry for breakfast—and they dropped in occasionally all through the day, eating camp biscuits and even visiting the refuse heap when nothing else was to be picked up. After the accident we found the lamed Jay a number of times on the side of a gulch a few rods from camp, and then realized that the Camp Bird who seemed our most assiduous visitor almost always carried food in the direction of the lame one. We also heard the injured bird call till he brought a comrade. Although his foot was so hurt that it would have been difficult for him to get food for himself, he was as strong as ever ten days after the accident, evidently in good condition and spirits. We could hardly escape the inference that he was fed by one at least of his

companions—or parents—if, as seemed probable, he were young of the year.

The following year, in the mountains near Taos, soon after reaching Wheeler Peak amphitheater, at 11,400 feet, an old Camp Bird discovered us, and after testing our camp biscuits promptly flew off and got one of its family, almost if not quite fully grown. The rest of the family were brought later and remained familiar friends as long as we were there. The young were the tamest, coming close to us at meals for whatever was thrown them. As late as July 26, one of them was seen fluttering its wings for food.

In nearly the same high altitudes, on Lost Trail Creek—between 10,700 and 11,000 feet—we again met the lovely birds. At 11,000 feet two were seen hopping over the ground in the woods so intent on something, probably ground fungus and toadstools, that they were oblivious of us. Quantities of the partially eaten tidbits were found near by reminding us that we had seen the birds eating toadstools the year before.

ADDITIONAL LITERATURE.—BRADBURY, W. C., Condor, XX, 197-208, 1918 (nesting).—DEMILLE, JOHN B., Bird-Lore, XXVII, 377-381, 1925.—SKINNER, M. P., Condor, XXIII, 147-151, 1921 (in Yellowstone).

NORTHERN BLUE JAY: *Cyanocitta cristata brómia* (Oberholser)

DESCRIPTION.—*Length: 11-12.5 inches, wing 5-5.7, tail 5-5.7, bill .9-1, tarsus 1.2-1.4. Adults: Crest and back purplish blue, tail and wings light blue, barred with black and marked strikingly with white, tail with white corners; forehead and neck black, underparts grayish. Young in juvenal plumage: Similar but crest shorter, coloration duller, and markings less distinct or partly wanting.*

RANGE.—Breeds from northern Alberta, northern Ontario, central Quebec, and Newfoundland south to North Carolina, Illinois, Missouri, and central Texas; casual in New Mexico and Colorado.

STATE RECORDS.—Fifty years ago Doctor Henry wrote that the eastern Blue Jay was reported to occur on the northern Rio Grande in New Mexico. No confirmation of this report had been received, nor was the presence of the species in the State known with certainty until on October 17, 1908, one was seen at Fruitland (Birds-eye), and the next day three more on the same ranch. Apparently this was a family party located here more than 300 miles west of the normal range of the species, from which it was separated by a wide stretch of treeless plains, and the main range of the Rocky Mountains. The conditions suggest that the birds had been brought there by human agency.—W. W. COOKE.

NEST.—Usually in trees, often in orchards about houses, made largely of dried twigs and rootlets. *Eggs: 3 to 6, pale olive, greenish, or buffy, sparsely spotted with brown.*

FOOD.—Largely mast, but also insects, including the codling moth larvae.

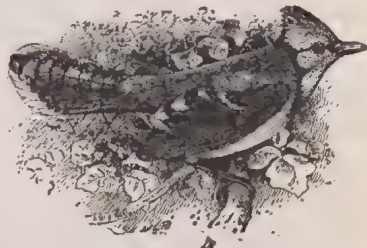


FIG. 83. Blue Jay

GENERAL HABITS.—The eastern Blue Jay is similar to the western. Long-crested in figure, voice, and general habits, but its short crest, bright color, and white markings are quite distinctive.

ADDITIONAL LITERATURE.—CHAPMAN, F. M., *Camps and Cruises of an Ornithologist*, 5-14, 1908 (nesting).—DUTCHER, WILLIAM, Educational Leaflet 22, Nat. Assoc. Audubon Soc.—MILLER, O. T., *A Bird Lover in the West*, 126-153, 1894.

LONG-CRESTED JAY: *Cyanocitta stelleri diademata* (Bonaparte)

PLATE 47

DESCRIPTION.—*Length:* About 11.7-13.7 inches, wing 5.6-6.4, tail 5.2-6.2, bill 1-1.1, wings and tail rounded. *Adults:* High black crest strongly contrasted with sooty gray (nearly mouse-gray) of back and scapulars; streak over eye white, and forehead conspicuously streaked with bluish white; wings and tail blue, barred with black; rump and underparts light blue. *Young:* Similar, but duller, plumage without blue except for a tinge on the side of the rump, no white about eyes; wings and tail often without distinct black bars, rump and underparts ash-gray.

RANGE.—Apparently resident in the Canadian and Transition Zones of the southern Rocky Mountains from northeastern Utah, northern Colorado, and central western Texas south to Zacatecas and Jalisco. Accidental in Quebec.

STATE RECORDS.—When Doctor Kennerly crossed New Mexico in 1853, at a place 100 miles west of Albuquerque on November 17, he secured a specimen of the Long-crested Jay, which Baird used as the type of his *Cyanocitta macrolopha*. Later it was ascertained that the subspecies had been previously described by Bonaparte under the name *diademata*. Baird's *macrolopha* was therefore replaced by *diademata*, but its English equivalent was still retained for the common name.

The species breeds throughout the mountains of New Mexico east to Halls Peak (Barber); Mesa Yegua (Bailey); Capitan Mountains (Gaut); and Guadalupe Mountains (Fuertes). [It breeds down to 7,000 feet in the Black Range; was abundant in yellow pines in the Animas Mountains, May 8, 1920 (Ligon)]; seen at about 7,500 feet at Mesa Yegua (Bailey); in the Pinos Altos Mountains (Fisher); and up to at least 9,000 feet, with the larger part probably not nesting above 8,500 feet. The upper limit of the actual nesting range is difficult to ascertain because as soon as the young are old enough to travel, both old and young roam over the mountains and ascend occasionally as high as 10,700 feet on Lake Fork in the Taos Mountains, to an equal altitude in the Culebra Mountains, and to 11,000 feet on Jack Creek on Pecos Baldy (Bailey). A nest with one egg was found April 26, 1913, at 8,000 feet in the mountains near the Middle Gila River in Socorro County (Ligon). [A nest with eggs was found May 11, 1919, in Apache Canyon 20 miles southeast of Santa Fe, and a nest with fresh eggs, April 30, 1922, in Santa Fe Canyon (Jensen). Nests with fresh eggs are found about May 1, over most of its range (1918), but one nest with 4 fresh eggs was found June 8, 1920, 8 miles northwest of Chloride on Mineral Creek (Ligon); and well grown young out of the nest were seen at Lake Burford June 16, 1918, where the species was common (Wetmore).] Young nearly grown were noted July 16, 1903, at 8,000 feet on the Pecos (Bailey).

During the winter, the species descends into the valleys even to 4,000 feet on the Rio Grande at Fort Thorn (Henry); while it also remains on the lower slopes of the mountains up at least to 8,000 feet. In the Guadalupe Mountains it was abundant above 5,500 feet in January, 1915 (Willett), and it was taken at Silver City, 5,800 feet altitude, January 25, 1914 (Kellogg).—W. W. COOKE.



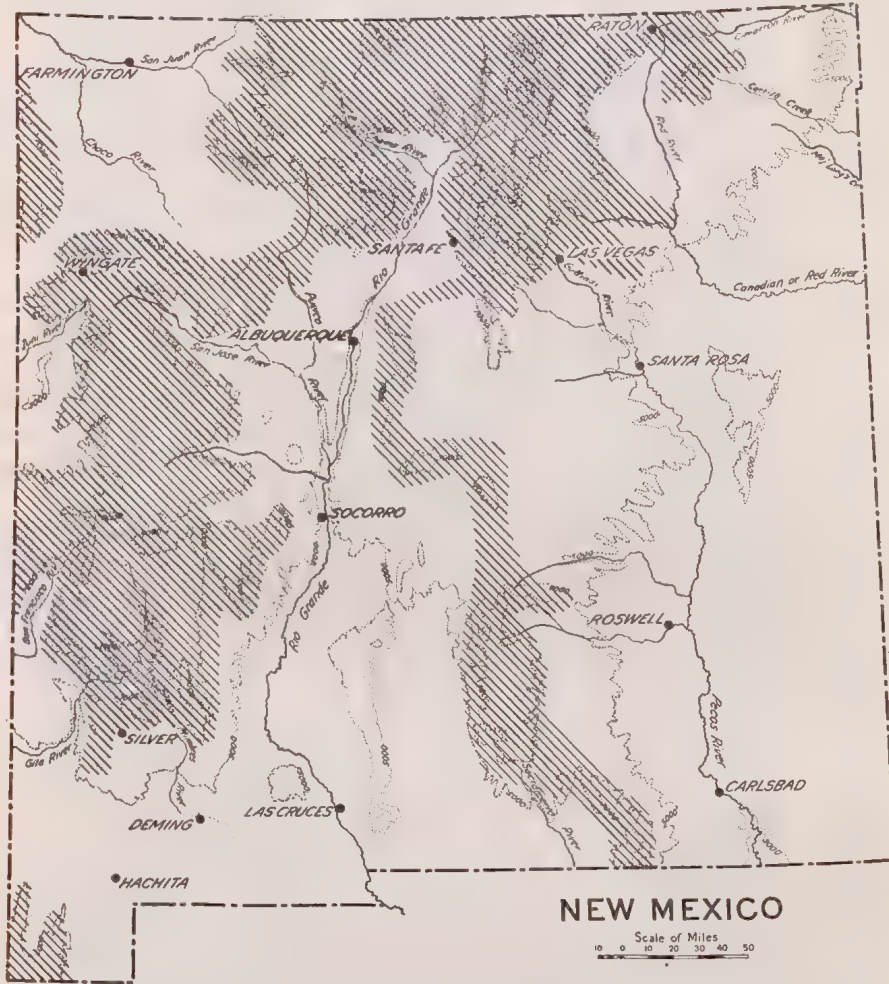
From Handbook of Birds of the Western United States

LONG-CRESTED JAY

The mountain king of the jays, with his white-streaked, high black crest, his handsome dark blue wings and tail, and turquoise rump



NEST.—In trees and bushes, usually less than ten feet from the ground, bulky but well concealed, made largely of twigs, moss, and dry grass, and sometimes cemented with mud and lined with rootlets, pine needles, or grass.¹ **Eggs:** 3 to 6, dull, pale bluish green, spotted and blotched over the entire surface with browns and lavender.



MAP 33. LONG-CRESTED JAY

Shaded areas show breeding and summer range in Transition and Canadian Zones

Food.—The food of the crested Jays is of little economic importance. About one-third is animal and two-thirds vegetable, the chief food being acorns. The destruction of birds' eggs is their worst dietary fault.

GENERAL HABITS.—In going up the mountains of New Mexico, on reaching the yellow pines the loud energetic *whack-ack-ack*, *whack-ack-*

¹ A nest found by Mr. Ridgway, June 25, 1869, in the Wasatch Mountains, saddled on a horizontal branch, was made of strong coarse sticks rudely put together, upon which was "a solid, firm plastering of mud of a uniform concave shape, lined with fine, wiry rootlets (Baird, Brewer, and Ridgway, History of North American Birds, Land Birds, vol. 2, pp. 281-282).

ack-ack-ack-ack-ack, coming from the tree tops, attracted our attention to the Long-crested Jay, one of the most positive characters and handsomest birds of the forest, with high black crest and rich quiet tints lighted by turquoise. Its actions show keen perception and prompt decision as it flies about or climbs up the branch ladders of the trees. An old one who brought her nearly grown brood into the bushes on the edge of camp, one morning, ran out into the grass by our tent to pick strawberries for them. Quickly spying the red berries, she would pick one and with a toss of the head throw it well back in her bill, to be held there till she had accumulated enough to make it worth while to fly back to the young.

While we were with them, a real song was twice heard from the Long-crested Jay, a squeaky conversational effort to be sure, but one with modulations and a tone of content much better than fine frenzy.

In the Datil Mountains at 9,000 feet, where Mr. Hollister found the Jays especially common, in October they were feeding on acorns from an oak grove surrounding his tent. At Twining, late in the fall Mr. Surber found them very numerous and almost as gentle as the Rocky Mountain Jay. "They would come to my door every morning," he says, "as near the same time as if they had a time piece to govern them, and make such a racket that I would get up and open the door to stop their noise. One got so tame that it would come into my room."

In the fall, Mr. Henshaw states, the Long-crested Jays move about in parties of six or-eight, and spend considerable time on the ground, hunting after seeds, acorns, and berries, which supplement at this season their usual fare of seeds of conifers (1875, p. 336). This movement of small parties of Jays would seem to be merely wandering, but as Doctor Wetmore reminds us in "Migration of Birds," in a chapter entitled Migration Among Supposedly Resident Birds, "blue jays and woodpeckers, nuthatches and chickadees, may be present constantly through the year, yet the individuals seen in winter are not always the same as those observed during summer" (1926a, p. 84). In the future, it is to be hoped, bird banding will here, as in many other cases, substitute definite knowledge for speculation.

WOODHOUSE JAY: *Aphelocoma californica woodhousei* (Baird)

PLATE 48

DESCRIPTION.—*Length: 11.5-12.7 inches, wing 4.7-5.3, tail 5.2-6.2, bill .9-1, tarsus 1.4-1.5. Head uncrested, tail graduated. Adults: Upperparts, including wings and tail, dull blue except for mouse gray back and scapulars, and whitish streaks over eye; underparts gray except for throat which is grayish white, streaked with bluish gray. Young: Wings and tail similar to adults, but rest of upperparts gray, with indistinct whitish streaks over eye; underparts brownish gray, deepest on chest.*

RANGE.—Upper Sonoran Zone of Great Basin and adjacent arid region, apparently resident from southeastern Oregon, southern Idaho, and southern Wyoming south to western Texas, New Mexico, Arizona, and southeastern California.



From Handbook of Birds of the Western United States

WOODHOUSE JAY

A flat-headed, dull-blue jay of the lowlands

STATE RECORDS.—The Woodhouse Jay ranges throughout much of New Mexico, the center of its abundance being in the scrub-oak belt (Ligon). It ranges east to Oak Canyon near Folsom, September 1, 1903 (Howell); Tucumcari, June 18, 1903 (Weller); and the Guadalupe Mountains, August 1-10, 1901 (Bailey). North and south it extends across the State and slightly into Mexico, where it was taken at White Water, Chihuahua, June 17, 1892, just south of the New Mexico boundary (Mearns). The type specimen of this species was taken by Doctor Henry at old Fort Thorn. No great number of nests have been reported, and the probable breeding range must be deduced largely from occurrence during the normal breeding season. [It is specially abundant in the Black Range and Mogollons (1916-1918). Young were very abundant in Cuchillo Hills, northeast of Fair View, August 4, 1919. Young as large as adults June 23, 1919, seen on Little Rio Grande, 10 miles south of Taos at 7,400 feet; common in the Animas Mountains, May 7 and 8, and in the Burro Mountains, May 10, 1920 (Ligon).] April and May are the principal months for eggs, and full grown young on the wing have been noted in 1899, by June 13, at the east base of the Capitan Mountains (Bailey). A nest with eggs was found April 20, 1913, at 8,000 feet in the mountains east of the Middle Gila River, Socorro County, and one with young about four days old May 4, 1913, at 6,800 feet on the east side of the Cuchillo Mountains. Many nests were found in April and May, 1913, all in scrub oaks, at altitudes from 6,200 to 8,000 feet. [Fresh eggs were found from April 19 to May 1, 1916, in the Mogollon Mountain region (Ligon).] The species breeds as low as 5,000 feet at Carlisle (Barrell); near Santa Rosa, and up to about 7,000 feet at Fort Wingate (Henshaw); [up to 7,500 feet on Mt. Taylor (1916-1918),] and to 8,000 feet in Socorro County (Ligon). In the Red River foothills, Colfax County, it was found July 28-October 24, 1913 (Kalmbach). [Two were seen near Gallup, September 30, 1916 (Skinner).] In the fall they move up to 8,000 feet at Gallinas (Bailey) and near Chloride (Goldman).

During the winter, they do not usually remain at a higher altitude than the breeding range, while they come at this season into the lowest wooded canyons; Silver City, November 10, 1912 (Kellogg). In the Guadalupe Mountains they were common from 4,000-7,000 feet in January, 1915 (Willet); and in the Guadalupe Mountains south of Queen many were seen in the scrub oak, December 31, 1915 (Ligon).—W. W. COOKE.

NEST.—Often in scrub oak or pinyon pine, two to four feet up; an outer basket-like framework of twigs holding the inner cup made of weed stalks and rootlets lined with horsehair. Eggs: 3 to 6, light bluish green, rather sparingly flecked over the entire surface with rusty brown and colored with duller shell markings.

FOOD.—In some of the few stomachs examined, three-quarters of the food consists of pinyon nuts. Acorns, wheat, ground beetles, grasshoppers, caterpillars, and ants are also eaten.

GENERAL HABITS.—Among the nut pines, junipers, and scrub oaks of Upper Sonoran Zone, the round-headed Woodhouse Jay is frequently seen flying away on outspread rich blue wings and tail, squawking vociferously, and often followed by the cries of outraged parents whose eggs or young it has destroyed. Flycatchers and vireos Mr. Ligon found to be the special sufferers along Chloride Creek. As he writes, "The nest of a Black Phoebe had two dead young with bill prints in their heads, while many nests were torn to pieces. That the small birds are constantly quarreling with them is evidence of their robbing habits. I had collected a set of Phoebe eggs, and put them at the root

of a walnut tree while I walked a little way down the canyon. On my return, although the eggs were within a few feet of my camp, a Jay had destroyed all but one. I watched and in a few minutes he returned, but for his last time" (MS). At Fruitland, in October and



MAP 34. WOODHOUSE JAY

Shaded area shows general range in Upper Sonoran foothill country

November, Mr. Birdseye found the Jays staying around farm buildings picking up food. Like the rest of the jays, as Mr. Robert B. Rockwell says, they are very inquisitive birds, and a good deal of their time is spent "investigating," but they are also cautious and secretive, especially about the nest.

Their notes Mr. Ridgway considers "harsh and piercing to an extreme degree." "That most frequently uttered," he says, "is a shrill screech, sounding like *we'ahk, we'ahk*, whence the name bestowed upon it by the Paiute Indians"—*we'ahk* (1877, p. 527).

ARIZONA JAY: *Aphelocoma sieberi arizonae* (Ridgway)

DESCRIPTION.—*Length*: About 11.5–13 inches, wing 6.1–6.5, tail 5.6–6.1, graduated for .5–.6, bill 1, tarsus 1.5–1.6. *Wings longer than tail*. *Adults*: Upperparts wholly blue, including wings and tail, dull blue on back; sides of head blackish, under parts bluish gray, paler but not streaked on throat, bluest on breast, whitening on



MAP 35. ARIZONA JAY

Shaded areas show general range. Triangles mark breeding and yearlong records

belly; bill black, sometimes irregularly patched with whitish. *Young in juvenal plumage*: Upperparts dull gray, with blue wings and tail; underparts much like adult. Bill mainly flesh-colored below.

RANGE.—Presumably resident in Upper Sonoran Zone in southeastern Arizona, southwestern New Mexico south to Chihuahua and Sonora.

STATE RECORDS.—As its name implies, the principal home of the Arizona Jay is in that State, whence it enters a short distance into extreme southwestern New

Mexico. It was reported in 1858 by Baird at Copper Mines—Fort Webster. [Common in the southwestern part of the State east to the Mimbres River and north to Silver City, Alma, and the Mimbres Post Office 5 miles north (Ligon, 1916-1918).] It is known northeast to Fort Bayard (Henshaw); east to the Animas Mountains (Goldman); and the San Luis Mountains (Mearns). Though here at the limit of its range, it is a common resident at Silver City (Hunn). It was found in abundance in the Animas Mountains, July 29–August 7, 1908, from 5,800 to 6,800 feet, and equally abundant in the Burro Mountains, 6,000–7,000 feet, September 15–23, 1908 (Goldman); [still abundant in Animas and Burro Mountains in 1920 (Ligon).]

The first eggs known to science were taken April 29, 1876, near Fort Bayard (Stephens). [A completed nest was found April 28, 1916 (Ligon).]

The species is [apparently] non-migratory, except as it wanders in the fall and winter a few miles out into the foothills and plains.—W. W. COOKE.

NEST.—In scrub oaks, rather flattish, the framework made of small sticks enclosing the nest of interwoven rootlets, sometimes lined with horsehair. *Eggs*: Usually 4 or 5, *unmarked*, light greenish blue.

FOOD.—Largely acorns, but also wild fruit and seeds, grasshoppers, beetles, true bugs, gray tree moths, and alfalfa weevils.

GENERAL HABITS.—The blue Arizona Jays, to be distinguished from the Woodhouse by the absence of gray on the back and white streaking on the throat, are abundant in the live oak regions of the mountains of southeastern Arizona. They were found by Major Goldman late in July, 1908, common along Indian Creek in the Animas Mountains from 5,800 to 6,800 feet, in oaks and pines. "They were quite tame," he writes, "and the noise they made was somewhat annoying when hunting for other birds. The sound of a shot caused them to scatter, but soon they were back to the tree tops over my head, screeching and scolding and jerking themselves to and fro for emphasis. Early one morning a Jay with wings in soaring position was seen to take a large insect flying about twenty feet from the ground. The bird then alighted in an oak near, and sat a moment while swallowing the insect" (MS).

According to the observations of A. P. Smith, the Jays do good work in reforestation during the acorn season. In describing their work he says, "numbers of the birds are seen flying back and forth. The ground selected contains much rubble, running to small fragments, say the size of a man's fist. Generally the acorns (for several are often deposited in one spot) are pushed under the side of the stone nearest to or facing the ravine; a wise provision for the bird's future, and a fortunate one for the possible future oak, as it guards against washing out in times of heavy rain; likewise conserving moisture in the months of drought. The spring and summer of the present year (1907), were dry, very dry; yet in many slopes seedling oaks were growing vigorously. No parent oak in the vicinity grew at a higher level; and as the acorn is quite too heavy to be transported by wind action—at least upward—one may figure out conclusions" (1908, p. 78).

In an interesting account of the Arizona Jay in the Huachuca Mountains, Mr. Swarth says they are "very gregarious, and even during the breeding season may be seen traveling through the oaks in flocks of fifteen or twenty or more, ostensibly seeking for food, but also on the lookout for trouble, or any excitement which might turn up . . . the crowning joy of all is to find some wretched fox or wild cat quietly ensconced on some broad, sheltered oak limb. In such a case the one that finds the unhappy victim takes care to let every Jay within half a mile know from his outcry that there is some excitement on hand; and it is nothing unusual to see thirty or forty birds gathered about the object of their aversion. . . . On one occasion I had an excellent opportunity of watching about twenty Arizona Jays protesting at the presence of a rather large rattlesnake which was leisurely traveling down a dry watercourse which passed our camp. The Jays seemed imbued with a wholesome fear of their wicked looking antagonist, and though they surrounded it, kept at a respectful distance . . . uttering low querulous cries, quite different from their usual outbursts. Some of the boldest lit a short distance from the snake, and strutted before it in a most curious fashion, head and body held bolt upright, and the tail pressed down on the ground until about a third of it was dragging" (1904, p. 30).

AMERICAN MAGPIE: *Pica pica hudsónia* (Sabine)

PLATE 49

DESCRIPTION.—*Length* (fresh): 17.4–21.7 inches, wing 7.3–8.4, tail 9.3–11.9, bill 1.1–1.4, tarsus 1.7–1.9. Nostrils covered by bristles; *tail extremely long, graduated* for fully half its length; wings short and rounded, feet stout. *Adults*: Black varied with bronzy, blue or green metallic gloss except for *white on lower underparts*, scapular patch and inner webs of primaries, and grayish band across rump. Naked skin back of eye, black. *Young in juvenal plumage*: Black areas dull instead of glossy, white scapular patches tinged with buffy, black throat and breast more or less spotted with white; but wings and tail brilliantly metallic like those of adult.

RANGE.—Mainly Boreal and Transition Zones from the eastern Aleutians, middle Yukon, central Alberta, southern Saskatchewan, and Lake Winnipeg south (between eastern slope of Cascades and Sierra Nevada on the west and central North Dakota and western Nebraska and Kansas on the east, south to New Mexico and Arizona. Mainly apparently resident, but in the northern part of its range wanders erratically after the breeding season.

STATE RECORDS.—The first New Mexico magpies recorded were seen July 27, 1820, on Long's Expedition to the Rocky Mountains, near the head of the Mora River (in James, 1823, vol. 2, p. 80). The southernmost breeding range of the Magpie is found in northern New Mexico, where it breeds south to Mora (Abert); [Rio Pueblo, 30 miles south of Taos at 7,800 feet, June 27, 1919 (Ligon); on the Santa Fe River 2 miles southwest of Santa Fe, at 6,800 feet, May, 1921 (Jensen)]; Espanola (Loring); Valle Santa Rosa (Bailey); [Bernalillo, July, 1918 (Leopold)]; Lake Burford, May 23–June 19, 1918 (Wetmore)]; Fort Wingate (Henshaw); east to Raton (Coues); Halls Peak (Barber); Old Fort Union (McCauley); and along the edge of the Red River foothills near Koehler (Kalmbach). [Seen about Cimarron and found soon after, June 18, 1924, feeding young 3 miles southeast of Elizabethtown. where there

were a number of nests in marshy valley land at about 9,000 feet (Ligon). Common in the Jemez, Carson, and Pecos National Forests (Ligon, 1916-1918); plentiful near Valley Ranch on the Upper Pecos in summer and resident in Rio Arriba County (Leopold).] It breeds from the lower canyons of its range about 7,000 feet, even as low as 5,000 feet near Shiprock (Gilman), up to 9,500 feet in Costilla Canyon.

After the breeding season, it has been taken south to the Manzano Mountains (Gaut); [Alameda, October, 1918, and Bosque Ranch south of Isleta, fall of 1917 and



FIG. 84. Young American Magpies

From Biological Survey

Late Magpie broods are sometimes fed on alfalfa weevil larvae

1918; Tome and Piralta 1919-20 (Leopold)]; and to near McKnight Creek in the Mimbres Mountains directly west of Hillsboro Peak (Bergtold); in the Guadalupe Mountains the last of September, 1900 (W. L. Knight); and reported from the Sacramentos. In Union County, several were seen November 5, 1915 (Ligon). In the fall it ranges over the upper slopes of the mountains to at least 10,700 feet in the Culebra Mountains (Bailey); and to 10,400 feet below Pecos Baldy (Surber).

In the winter, these higher parts are deserted and the flocks congregate in the valleys at 5,000-8,000 feet. [Observed about Santa Fe in winter, and 3 poisoned at a carcass 12 miles south of Lamy, February 1917 (Ligon); noted near Bernardo, December 28, 1919 (Leopold); common in northern Santa Fe County in fall and winter (Jensen, 1923).]—W. W. COOKE.

NEST.—Usually in colonies, in thickets or trees; an inside cup made of twigs, rootlets, and dry grasses, cemented with mud, lined with grass, hair, and sometimes pine needles, more or less completely enclosed by an open lattice-work of coarse sticks, at times making a mass as large or larger than a bushel basket, with a lateral covered entrance. **Eggs:** 7 to 10, dull grayish or sometimes greenish, dotted, dashed, and heavily blotched with purple and brown, usually covering the whole surface.



From Handbook of Birds of the Western United States

AMERICAN MAGPIES

Their bronzy iridescence adds beauty to their striking black and white plumage

Food.—Adults: Grasshoppers, a destructive black cricket, caterpillars, ground beetles, alfalfa weevils (one bird had eaten 181 adult weevils, and another, 24 adults and 180 larvae) codling moth larvae, rodents, carrion, and waste grain. *Nestlings:* Caterpillars, 22.1 per cent, many of them cutworms. Small mammals and carrion, 14.75 per cent (the mammals including meadow mice, ground squirrels, gophers, and shrews), beetles 5.15 per cent, alfalfa weevils 2.42 per cent. One half-fledged young



MAP 36. AMERICAN MAGPIE

Shaded area shows 1926 breeding range. Triangles outside of shaded area mark mostly fall and winter records

had been fed 74, and 5 had eaten, respectively, 62, 55, 33, 26, and 24. Eighty-five different items of food were recognized, including spiders, crustaceans, earthworms, reptiles, birds, mammals, and seeds of plants.

GENERAL HABITS.—The economic relations of the Magpies, in many localities, of necessity overshadow all their other relations, but the bird student from the East, where they are unknown, must be

pardoned for looking upon them impersonally, broadly, as appropriately remarkable inhabitants of the great West. They are such large striking birds, with their handsome glossy black and snowy white plumage, long tails, and direct, powerful flight that even a single one would command the attention of the passing field worker; but as they generally go in noisy flocks, the places where they are encountered become interesting milestones in ornithological journeys, good to recall. Each meeting hints of the life and habits of these original characters, for they are always full of business, quite absorbed in important matters of their own.

On our way up to Pecos Baldy with a pack outfit, in 1903, when reaching the open mesa, at 10,400 feet, three or four Ravens and four Magpies were discovered perched on a corral fence near the carcass of a cow, and to our amusement the Ravens, jealous of their feast, ignored us entirely in attempting to get rid of the Magpies. As we were driving from Las Vegas north to Taos Pass a month later, near Sapello a flock of thirty or forty Magpies flew up in alarm as we rattled by; a few miles south of Mora, two days afterwards a flock of about fifty, found in a hayfield were too engrossed catching grasshoppers to notice us. Two specimens, reluctantly taken, had their gizzards full of the big wingless kind. Magpies were also seen in driving along Coyote Creek Valley, the large, black-coated birds flying spectacularly about among the great bare masses of red sandstone—a picture to remember. An old nest on Coyote Creek, that varied from the usual globular form in being oddly roofed over on the southwest by slanting sticks, was carefully photographed, and we were reminded that the birds are said to gather at old nesting grounds every year to repair the nests that are not too dilapidated. One that suggested long use actually boasted several stories. On the east slope of the Taos Mountains Magpies were encountered at 8,800 feet; a little below, at a ranch on the edge of the Moreno Valley, old nests were found in a friendly neighborhood in the willows, and later a flock of about eighteen of the carnivorous birds was met with, apparently attracted by the killing of a beef. Five or six were watchfully waiting for favors, while a dozen more were passing the time doing scavenger duty by disposing of a dead prairie dog. On the west slope of the mountains Magpies were often welcomed at our camp at 7,700 feet, and in the valley below were met with near Taos.

In 1904, when we had again taken up our work in the region, we marked another ornithological milestone on the Costilla River at 10,000 feet, for here to our satisfaction, we encountered a flock of seventeen Magpies gathered at an old corral. Two days later we were interested to find what we took to be the same wandering flock about five miles farther up the valley, at 10,700 feet. This time two burros out at

pasture were the attraction and we were concerned at seeing four of the big, black birds sitting on the back of one of the little animals. Besides the nest found at 9,500 feet in Costilla Canyon, others were found in the willows at 9,400 feet, where, much to our pleasure, the birds came familiarly about camp, attracted by fresh meat. The cultivated valley bottom was well occupied by the useful scavengers, and they abounded in the Mexican towns of Costilla and Pinal, especially in the corrals and sheds, sometimes walking about familiarly with the chickens. In the San Juan Mountains a flock was seen about three weeks later near a sheep camp, part of the noisy band flying down toward the San Antonio River, apparently for a morning drink. On the ridge above the Tusas River some were seen about the slopes where the sheep had been, and nests were found in a line of willows. Near the fork of the Tusas, below a ridge-back of aspens, pines, and spruces, a number were found on a sunny southwest slope, with a company of Western Crows, Brewer Blackbirds, and Pinyon Jays, apparently catching grasshoppers. On the crest of the range, at about 10,000 feet, a flock was found in the trees about camp, a sheep camp on an opposite slope in this case explaining their presence.

On our way through the country the Magpies were found commonly not only where there were sheep and goats but also in Indian and adobe villages, perhaps performing valuable services as scavengers while adding a feature of interest to the picturesque native life, a feature well calculated to stamp itself on the memory of the wayfarer. On the Jicarilla Apache Reservation their nests were seen at several of our camps. In Santa Clara Canyon at about 9,000 feet, near the divide, a flock of thirty or forty of the handsome black and white birds flew up before us from a blooming yellow *Senecio* slope where, presumably, they had been getting a meal of grasshoppers; and in the beautiful open Valle Santa Rosa country, as we drove along of a morning, they were often seen sitting in the sun talking and half singing in a contented warble.

But while the Magpie is a most interesting and enlivening comrade of the way to the field ornithologist, it presents many problems to the ranchman and the student of economic ornithology. "As an insect eater," Mr. Kalmbach tells us, "it has no superiors among its immediate relatives. Its consumption of destructive weevils, caterpillars, and grasshoppers, is a strong point in its favor." As an enemy of small mammals it destroys a certain number of noxious rodents. On the other hand, he adds, impartially, it "has some outstanding faults." Eggs and young birds are destroyed, and domestic fowls and their eggs are sure to suffer from it in areas "where it is abundant and poultry is not securely housed." As a carrion feeder it deserves some credit, but closely allied to its liking for carrion is its propensity for

"attacking sickly, newly branded young, or even healthy adult livestock." In certain localities, yielding to the temptation offered by man in depriving sheep of their protecting coats, it attacks the newly sheared sheep.

At times the Magpie becomes so bold or gathers in such great numbers that its faults become emphasized to the degree that a local reduction of its numbers is warranted. But, as Mr. Kalmbach well puts it, "As in most if not all problems of bird control, the real need for drastic action against the Magpie is confined to local areas where one or another of its faults has become unduly emphasized." Over much of its range, where it appears in moderate numbers, it is not an agricultural pest or a serious menace to other birds and its influence may even be decidedly beneficial. Consequently, Mr. Kalmbach concludes, "before local campaigns of control are inaugurated, careful consideration should be given to their necessity and scope (1927a, p. 29).

In the San Juan Valley during the fall of 1908, Mr. Birdseye found the Magpies common. From October 14 to November 22, they were increasingly abundant at Farmington and were found down the river to the Colorado line, but especially at Fruitland, Liberty, and Shiprock. They nested throughout that part of the San Juan Valley lying in New Mexico, and their nests were seen in cottonwoods at Blanco, Fruitland, Shiprock, and about twenty miles below Shiprock.

At Farmington, Mr. Birdseye saw several kept as pets, one of them a very good talker, although it had been in captivity for only a few months. It was much less noisy than a parrot, and had a fairly clear, though somewhat nasal accent.

The ordinary voice of the Magpie, Mr. Henshaw remarks, is singularly flexible, ranging "from a guttural chuckle to the softest whistle," which explains its ability to imitate the human voice (1875, p. 334). "Chattering like a Magpie," Mr. Taverner says, "hardly gives a clear idea of the performances. They keep it up in season and out, but the talk is deliberate rather than 'chattering.' They are never still for a minute and their curiosity is insatiable. Every morning, he wrote, "our camp [in Alberta] was the center of interest and conversation to a group of these long-tailed clowns, uniting the gravity of judges with the talkativeness of a debating society" (1919, p. 252).

Along the San Juan River, French Gilman found the Magpies nesting everywhere, even in trees in the school yard. In recounting the story of one of them he says, "I was much interested in a one-legged old Magpie, we called her 'Peggy,' who was building in a tree just in front of my window. I was told that she had nested near the buildings the three years preceding. The old nests were much in demand for roof-trees by the English Sparrows, and to a less degree by House Finches. But I thought the limit was reached when we

found in one, a nest of four young of *Felis domestica* (Pussy-cat.) They were discovered by seeing the kittens peering from the nest, which was sixteen feet from the ground" (1908, p. 148).

ADDITIONAL LITERATURE.—BERRY, S. S., Condor, XXIV, 13-17, 1922.—DICE, L. R., Condor, XIX, 121-124, 1917 (nests).—GILMAN, M. F., Condor, IX, 9-12, 1907.—KALMBACH, E. R., Technical Bull. 24, U. S. Dept. Agr., 1927.—MILLER, O. T., A Bird Lover in the West, 216-230, 1894.—ROCKWELL, R. B., Condor, XI, 90-92, 1909.—WARREN, E. R., Condor, IX, 5-9, 1907 (photographs of nest and young).

RAVENS, CROWS, ETC.: Subfamily Corvinae

Wings long and pointed, much exceeding tail; legs stout, fitted for walking as well as perching; sexes alike, changes in plumage slight.

AMERICAN RAVEN: *Corvus corax sinuatus* Wagler

DESCRIPTION.—*Length*: About 21.5-26 inches, wing 15.1-18, tail 9-11, bill 2.4-3, depth of bill through nostril .8-1, tarsus 2.6-3. Expanse of wings 4-4½ feet. Nostrils large, entirely concealed by nasal tufts more than half as long as bill, *throat feathers lanceolate*, disconnected. *Adults*: Plumage *lustrous black*, with purplish, blue, and green burnishing; *feathers of neck dull gray at base*. *Young in juvenal plumage*: Duller black, lusterless brownish below, except on throat and chest.

RANGE.—Middle Western North America. Between northeastern Washington, western Wyoming, and southwestern Arizona on the west to central North Dakota, eastern Kansas, and central Texas on the east south through Lower California, Tepic and Vera Cruz to Honduras. Chiefly resident, but during fall and winter wanders more or less, especially in the United States.

STATE RECORDS.—The whole mountainous region of New Mexico is included in the range of the American Raven, and it breeds east at least to the Guadalupe Mountains (Bailey); Capitan Mountains (Gaut); Halls Peak (Barber); the Culebra Mountains, and on the plains, east to Cuervo (Bailey). [It was rather common in June, 1924, in the Abert section in southwestern Union County, where there were suitable nesting cliffs. Two were also observed, June 19, flying over Wheeler Peak and adjacent peaks (Ligon).] It breeds at 4,500 feet at Hachita (Goldman); and 5,000 feet at Shiprock (Gilman); to about 8,000 feet at Halls Peak (Barber) and Willis (Henshaw); and to 9,000 feet at Cloudercroft (Bailey). [In the Santa Fe region, nests with eggs and young respectively were found on rim rock near La Bajada Hill at 6,500 feet, April 22, 1922, and also on a cliff near the Lake Peak trail at 10,500 feet, May 20, 1922 (Jensen).] Young in the nest were found May 26, 1903, near Santa Rosa (Bailey); and a nest with eggs April 3, 1913, at 7,200 feet near Beaver Lake, Catron County (Ligon). [It was common and nesting at Lake Burford, 6,250 feet, May 23-June 19, 1918 (Wetmore). On the G. O. S. Ranch, 40 miles northeast of Silver City, it was nesting April 20, 1919 (Kellogg). While it is found nesting abundantly from April 1 to 10, at about 7,500 feet, it proves to be most common on the tributaries of the Gila River, southwest of Magdalena; along the Puerco River northwest of Albuquerque, on the Gallina and Chama Rivers, and about Lamy in deep canyons. A nest was seen with feathered young June 16, 1917, at about 7,800 feet northeast of Cloudercroft; and on July 7, 1917, five young going about with their parents on South Diamond Creek, at about 6,800 feet. On July 19, 1919, two adults with five young were seen on the Pecos River at 7,500 feet (Ligon).]

In the fall the Ravens with their grown young ascend high into the mountains, even to the tops of the highest peaks. [On July 17 and 18, 1919, several were noted

almost constantly about the top of Pecos Baldy and also on the Truchas Peaks, from 12,000 to 13,000 feet (Ligon).] They were seen in early August, 1903, at 11,000 feet below Pecos Baldy, and a feather was found on the top of Pecos Baldy, 12,600 feet (Bailey). The next year on July 24 a party of six were seen sailing around the crest of the Taos Mountains at least 13,000 feet above ocean level; from July 28 to October 24, 1913, a flock of 10 to 15 were daily visitors at Koehler Junction (Kalmbach). [On August 27, 1917, many were seen between Las Cruces and Socorro (Ligon); and on September 29 and October 4, 1916, some were seen at Stateline and near Zuni (Skinner).] The snows of early fall drive the birds from these extreme altitudes, though as late as November 1, 1903, two were seen flying at timberline near Twining (Surber).

The winter is spent in the valleys and foothills for the most part below 7,500 feet. Three were seen at Albuquerque on Christmas, 1902 (Harman); they were abundant at about 7,000 feet near Las Vegas, January 6, 1847 (Abert); and they spend the winter regularly around Fort Wingate at about the same altitude (Shufeldt). In the region of the Carlsbad Bird Reserve they were fairly common in January, 1915; and noted during the winter of 1915-16; [on the Rio Grande Bird Reserve (Elephant Butte), one was seen November 27, 1916 (Willetts)].—W. W. COOKE.

NEST.—Usually on cliffs in inaccessible places, in rim rock and box canyons, a mass of sticks, lined variously with cottonwood bark, moss, cattle hair, and wool. Eggs: 5 to 7, pale green, olive, or drab, the whole surface profusely dotted, blotched, and clouded with purplish and various shades of brown.

FOOD.—Mainly carrion, but also young birds, eggs, locusts, grasshoppers, and other insects.

GENERAL HABITS.—Scattered though they are in the breeding season, one pair perhaps to a desert range, the large black American Ravens are not infrequently seen when one is traveling through the plateau mesa country or camping near rocky canyons in the mountains. Sometimes you are notified by the swish of big wings and a hoarse croaking *kar'r* that one is passing; sometimes you see one launch from a cliff, spreading its wide black wings as it drops down the wall into the canyon; and some day, perhaps, you may be fortunate enough to see one circling around in the sky, rising higher and higher, all the time uttering its rhythmical cawing.

In the breeding season you scan the cliffs with your field glasses for their nests and the discovery of one is as notable as the finding of an Eagle's aerie. A characteristic one at the north end of the Staked Plains that we located near the top of a cliff was probably two or three hundred feet above the foot of the wall, almost hidden in a niche of dark red sandstone and roofed by a projecting rock so that it could be reached neither from above nor below. All but one of the nests found by Mr. Ligon have been on cliffs, the exception being one in the top of a Douglas fir, in the Sacramento Mountains. Three other nests in trees were found by a hunter in the same locality, there apparently being no suitable cliffs in the region.

Below Pecos Baldy, near our Jack Creek camp at 11,000 feet, from which, in July, 1903, we saw five of the great birds circling around

in the sky, the Ravens, like the Turkey Vultures, were attracted by a line of meat-baited traps, going so far as to spring some of the traps and take the bait. And, in the Predatory Animal work of the Bureau of Biological Survey, the Ravens help locate the carcasses of domestic stock or game killed by the predatory animals. As Mr. Ligon puts it, they are "the best witnesses to the slaughter committed by such animals." At Lake Burford in 1918 Doctor Wetmore saw a Raven light near his cabin and pick up and eat several white-footed mice which he had trapped and thrown away. The birds were common around the lake, nesting on the cliffs in the canyon below, and coming over to feed along the lakeshore and in the sage-brush (1920a, p. 401).

In San Juan County, Mr. Birdseye found them abundant at Farmington, Fruitland, Liberty, Shiprock, and from below Shiprock to the Colorado line; also quite common at Blanco. In the Zuni Valley, in the Indian cornfields, he says he found "more or less skillfully made scarecrows," but at Acoma, where numbers of Ravens were seen from our camp flying toward the cliffs below the pueblo to roost, one of the Indians questioned did not seem to think that they did much harm.

In the winter, Mr. Ligon has found the Ravens going about in pairs and he thinks that they remain mated. At this season they come into towns and are far less shy than during the early summer. At Albuquerque one was seen by Mr. Loring perched on a cow's back, and at Deming they were found feeding in the streets acting as important scavengers, while a dozen seen in a hogyard, feeding with the hogs, allowed a person to pass within twenty feet of them without their flying away. Such is the pauperizing influence of contact with the white man! Let us forget it and think of the noble birds in their own proper environment—among the silent mesas and remote canyons of the great West.

ADDITIONAL LITERATURE.—HARLOW, R. C., Auk, XXXIX, 399-410, 1922 (breeding habits).

WHITE-NECKED RAVEN: *Córvus cryptoleúcus* Couch

DESCRIPTION.—*Length*: 18.7-21 inches, wing 13.1-14.2, tail 7.5-8.6, bill 2-2.3, depth of bill at base .8-.9, tarsus 2.2-2.5. Like the American Raven but *decidedly smaller*, with relatively shorter bill and longer nasal plumes. *Adults*: Glossy black, upperparts (except hind neck) with a violet sheen, underparts faintly glossed with bluish; *feathers of neck and breast pure white for basal half*. *Young*: Dull black, feathers of neck and breast *white* below the surface; feathers of throat short, not lanceolate, wings and tail as in adults; basal half of mandible light colored.

RANGE.—Mainly in Lower Sonoran Zone in the southwestern United States and Mexico; from northern Colorado (formerly Nebraska and Kansas), through western Texas, New Mexico, and southern Arizona south to Michoacan, Guanajuato, and Tamaulipas.

STATE RECORDS.—The southern half of New Mexico is included in the normal range of the White-necked Raven, and it has not been found by the Biological Survey

parties in the northern half of the State, although they have traveled extensively over both mountains and valleys. Their most northern records are Cactus Flat (Bailey); Cutter (Ligon); Cuchillo (Goldman); Jicarilla Mountains (Gaut); Roswell (Bailey); and Fort Sumner (Ligon). While this probably approximates the present



From Biological Survey

FIG. 85. Nest of White-necked Raven

The sharp-pointed bayonets of the tree yucca (*Yucca macrocarpa*) make a protecting cordon around the eggs and nestlings. Ocotillas emphasize the desert character of the landscape

while other nests had one to five fresh eggs. On May 29, 1919, about a dozen nests were examined in mesquite bushes 10 to 22 miles southwest of Lovington on top of the Staked Plains at about 4,000 feet. Some had young beginning to feather, others very small young, while some had incubated eggs and others still lacked their full complements. On June 6, 1924, a nest with unfeathered young was found in a cottonwood about 5 miles northeast of Lovington. They were common in the Lower Pecos Valley and the southeastern section of the State. On May 31, 1919, a nest was found about 55 miles northeast of Carlsbad. The height of the normal nesting season seems to be early May, but unusually late or dry seasons may defer it until early June. About 18 miles south of Fort Sumner a pair seen June 18, 1918, were presumably nesting in the vicinity (Ligon).]

[After the breeding season, on August 26, 1917, many were seen between Silver City and Deming, and on September 14, 1917, about 200 were seen near Buckhorn (Ligon).]

Although wintering at Deming and El Paso, most of them are absent from the State during December and January, returning to the southern part in February. Similarly, at Fort Stockton, Texas, where they are very abundant in the fall, "they

range, before the buffalo disappeared the birds occurred much farther north. In 1880 they were abundant November 28-30, near Galisteo 20 miles south of Santa Fe (Goss, 1881b, pp. 118-119), and ten years earlier they were common along the whole western edge of the plains even to northern Colorado.

In New Mexico, at the present time, they breed from the lowest, hottest valleys of the State up to about 5,000 feet, and less commonly a thousand feet higher to 6,000 feet at Silver City (Hunn). In 1886, at Apache (Hachita), eggs were found on June 2, and young still in the nest all through July (Anthony). [Nests with young, June 29 and July 1, 1917, near Cutter, Sierra County (Ligon)]. The earliest eggs reported were May 2, 1908, near Engle, and the species was found up to 6,000 feet 30 miles west of Engle June 9, 1913. [From May 6-10, 1920, they were very abundant up to within 3 miles of Silver City, building nests everywhere in yuccas and mesquites,

disappear entirely in late November, after the crops are harvested, and do not reappear until late January or early February." In New Mexico early in March—March 11 and 12, 1918—great numbers were encountered, flocks of 100 or more being seen at Deming (Ligon).]—W. W. COOKE.



MAP 37. WHITE-NECKED RAVEN

Shaded areas show breeding range, mainly in Lower Sonoran Zone and the lower edge of Upper Sonoran Zone

NEST.—Frequently in mesquite, cate-claw, oak, ash, desert willow, and yucca; made generally with a framework of thorny twigs, lined according to locality with cattle hair, rabbit skin and fur, wool, bark, grass, or moss. **Eggs:** 4 to 6, greenish, generally with longitudinal streaks and hair lines, and blotches of lilac, gray, and drab; more or less hidden by brown spots and blotches.

Food.—Principally animal matter including carrion (as dead jack rabbits), cottontails and cotton rats, field mice, lizards, cicadas, alfalfa caterpillars and "conchuela"; also cactus, wild fruit, and probably waste grain. Stomachs of five young about ten days old examined by Ligon contained three small nestlings,

probably horned larks, birds' eggs, a small lizard, beetles, grasshoppers, and "jar flies."

GENERAL HABITS.—The smallest of the ravens, the White-necked is little larger than the Western Crow, but its voice, while not so loud as that of the American Raven, has the characteristic raven hoarseness, and when it is perching on a yucca or a fence post the white bases of the feathers of the neck sometimes show. It is a bird of the desert, and the grim Jornada del Muerto is said by Mr. Ligon to be the greatest White-necked Raven region he has ever seen. Here the birds nest, as in other deserts, mainly in tree yuccas. Near Mesilla Park they nest in big trees along the river, and in fall and winter, while bivouacking there, fly out widely over the valley and mesa. In the fall, Mr. Ligon says, they collect in flocks and are then generally to be found along the irrigated valleys where they get food.

In the fall migration in Cochise County, Arizona, Mr. Swarth and Mr. Willard witnessed a remarkable migratory movement. It was on the second Monday of November, 1911, that it began, the White-necks of the region gathering and migrating in one immense flock, extending nearly 3 miles along the foothills of the Dragoon Mountains. "There did not seem to be any regular flight," Mr. Willard states, "but a sort of general slow movement to the south. The birds were present in many thousands and it was two days before the last stragglers disappeared" (1912c, p. 107). An unusually cold winter apparently kept them away, the first returning on the twenty-second of February.

At Deming, as at El Paso, where they may be seen in and near town all winter, they act as scavengers, walking about on the main streets and visiting the dumping grounds, picking up what they can find. They "feed along the railroad tracks to within a few yards of the depot, apparently paying little attention to the rush of traffic about them." A pair which had become inured to civilization actually built their nest on the insulator brackets of a telegraph pole by a railroad track, where it was photographed. Along the line of the Southern Pacific Railroad in both Arizona and New Mexico, Mr. Ligon found great numbers of them on March 11, 1918, and he says that they seem to follow the railroad lines to get the scraps thrown from the diners. But they have not abandoned the role of hunter. In one place he came on six of them in company with two Swainson's Hawks pursuing one small jack rabbit.

The opposed good and bad food habits of the White-necked Raven in the Pecos Valley provide Mr. McAttee with a text for a most important discussion of the basic principles of economic ornithology. One man, whom he calls Mr. John Doe, "declared that without the Ravens it would not be possible to raise a crop of alfalfa seed in the Pecos Valley, inasmuch as the Ravens are the only control which they have for the

'conchuela' (*Chlorochroa ligata*), an insect of the stink-bug family. Mr. 'Doe' stated that every Raven was worth at least a dollar to him, and it was thoroughly understood by his hands that anybody found shooting one was fired then and there." In another place the Ravens were reported as saving the hay crop by feeding on the alfalfa caterpillar. They also serve as "scavengers in cleaning up dead jack rabbits." But in the Pecos Valley across the river from "John Doe," a man Mr. McAtee calls "Richard Roe," complained that "during the melon season the Ravens caused him twenty-five dollars damage a day by destroying cantaloupes and truck crops where not driven off, and he seemed to be just as eager to destroy the Ravens as Mr. 'Doe' was to protect them." As Mr. McAtee comments, . . . "Each man's view seems to be confined by a horizon of his own interests, which prevents his seeing those of even his neighbor's. Thus Richard Roe wants to exterminate the Ravens because they destroy his melons; he does not think of what would happen to his neighbor's alfalfa if he were successful in destroying the birds. Kill the melon depredators and we kill also the conchuela—and caterpillar-destroyers . . . a coordinating agency [such as the Biological Survey] is needed to balance the views of the Roes and Does, and weigh them in the light of other information available, in other words, reduce them to the average. Very few of our birds are either wholly bad or wholly good. . . . Birds must be judged on their general behavior and on average food habits." The relation of a bird to particular interests "is but one phase of many-sided activities of a creature which ranges the continent, and concerning which the public interest is certainly paramount to that of any and all private interests. A bird's general status as a wholly protected, a partially protected, or an unprotected species should depend on its general record at all seasons and in all localities. . . . In case of loss due to birds, measures, not involving the death of the birds, that will minimize or prevent the damage, should first be sought. If satisfactory means of this sort cannot be found, strictly local control may be authorized, but it should have none of the aspects of, and should not be allowed to grow into, a general campaign for extermination. . . . The proper remedy for local and sporadic depredations by birds is local and temporary control. . . . The degree of protection a bird should receive must be decided by competent and lawfully authorized bodies, and decisions should be based on the fullest possible information, permitting a just estimate or average of the bird's tendencies for good or bad at all seasons and over its whole range" (1927b, pp. 97-99).

In Carlsbad, where we found the Ravens in September, they had apparently come in from the surrounding desert and were common about the farms, where they were doubtless useful scavengers. Num-

bers of them were seen by Mr. Gaut in the Jicarilla Mountains gathered with a party of Turkey Vultures about the remains of a cow, and Mr. Ligon says they are almost equal to the vultures as scavengers, eating coyote as well as any other carcasses. Along the public roads where people camp, he says they keep watch and when the campers leave, visit the ground and clean up the waste—a humiliating comment on the slovenly habits of many of the traveling public. One of the birds which visited Major Bendire's camp near Tucson came regularly to his kitchen tent to pick up food thrown to him, and once carried off a salmon croquette and "made a trench in the hard soil fully two and a half inches deep and about twice as long" in which he buried it, carefully replacing the earth and covering it with a fresh chip, "possibly to mark it" (1895, p. 403).

ADDITIONAL LITERATURE.—BAILEY, F. M., Auk, XLI, 426-427, 1924.—BAILEY, VERNON, Condor, V, 87-89, 1903.—SMITH, A. P., Condor, X, 92, 1908.—SWARTH, H. S., Birds of the Huachuca Mountains, Arizona, 32-33, 1904.—TORREY, BRADFORD, Nature's Invitation, 211-214, 219-220, 221-223, 1904.

WESTERN CROW: *Córvus brachyrhýnchos h́esperis* Ridgway

PLATE 50

DESCRIPTION.—*Length*: About 18.5-19.2 inches, wing 11.1-12.7, tail 6.4-7.8, bill 1.6-1.9, depth at base .6-.7, tarsus 2.1-2.4. *Adults*: Black plumage of body glossed with violet, more strongly on upperparts, wings and tail partly glossed with greenish blue; feathers of throat short, blended. *Young*: Feathers duller and browner.

RANGE.—Largely resident in the western United States and southwestern Canada; from central British Columbia, Montana, North Dakota, and Wisconsin south to New Mexico, Arizona, and northwestern Lower California.

STATE RECORDS.—The Western Crow, which is common to the north and east of New Mexico, while it occurs and nests throughout the foothills in the northern part of the State is apparently nowhere common in the breeding season. [A pair, presumably with young, were seen 10 miles south of Taos; three were seen on the Santa Barbara on June 27, 1919, a family of five on the Pecos at 8,300 feet, July 19, 1919, and on the same day, one, 3 miles east of Glorieta at 7,500 feet. Nests were seen in Uraca Canyon, southwest of Cimarron, June 16, 1924. From June 18-21 the birds were met with quite commonly in the Sangre de Cristos and about Taos, and on June 22, about Chamita on the Rio Grande (Ligon). Nests have been found in the cottonwood groves along the watercourses in northern Santa Fe County—along the Pecos River near Valley Ranch, in Santa Fe Canyon, along the Nambe River, between Nambe Falls and Pojuaque, and along the Rio Grande near the San Juan and Santa Clara Indian pueblos. Fresh eggs are found the latter part of April (Jensen, 1922).] They are said to breed at 8,000 feet near Halls Peak (Barber); and both old birds and young-of-the-year were noted near Pecos July 3, 1903; near Glorieta at 7,000 feet, July 7-10, and thence during the remainder of the month along the Pecos to 7,600 feet. The following year old and young were seen together at about 7,400 feet in the neighborhood of Taos the second week in July (Bailey). [Several pairs were nesting at Lake Burford, May 23-June 19, 1918 (Wetmore).]

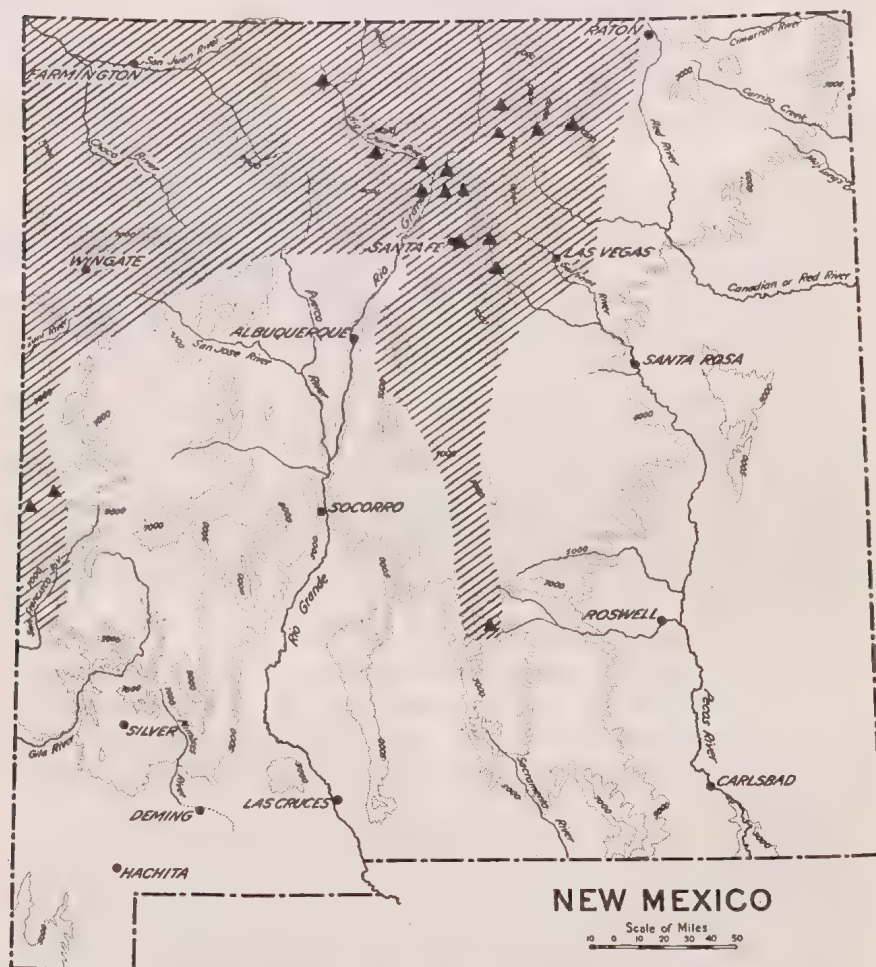
In fall and winter they scarcely ascend above 8,000 feet or casually to 9,000 feet as in the Gallinas Mountains, October 5-11, 1904 (Bailey). [On January 18, 1920, a flock estimated at 500 was seen 14 miles north of Las Vegas, at 7,000 feet.] In fall



From Biological Survey

Crow (*Corvus brachyrhynchos brachyrhynchos*)
Making remarks to a passer-by below

and winter the species becomes common in the northern and also the northwestern parts of the State, for "while holding rather accurately to its breeding range, it crosses over somewhat in the Rio Grande, Puero, and Bluewater Valleys, doubtless for food in irrigated districts (Ligon). It was found spreading out over the country west to Lake La Jara, in September, 1904 (Bailey); great numbers were seen in December, 1909, about the fields of Laguna; it appears in the western part of the State at Luna;



MAP 38. WESTERN CROW

Shaded areas show general range. Triangles mark breeding and breeding season records

and drops down into the White Mountains near Mescalero on the Ruidoso [those seen in February, 1917, 16 miles south of Lamy were headed south, evidently on their way to the White Mountains (Ligon)]. During several years' residence in southern New Mexico, Doctor Henry saw only two birds, both at Fort Webster, but a small flock was seen in April, 1876, on the Upper Mimbres (Stephens); and one was taken October 14, 1898, at Ruidoso (Barber). The most western records are from Catron County—Bill Night Gap, where two were seen at about 8,400 feet, 15 miles from the Arizona line, and from Luna about 5 miles from the line (Ligon).

[On March 26, 1926, Ligon observed about 100 birds 3 miles south of Bernalillo, which as a rule represents about the southern limit of range on the Rio Grande. But in the same year he discovered 3 at Cottonwood Springs on Cuchillo Creek, 10 miles west of the Elephant Butte Dam—100 miles out of their regular range. Mr. Leopold considers their distribution "very spotty," they having been noted near Glorieta on the Pecos, April 30, 1917, August, 1917, and August, 1918, occurring regularly near Lamy, but not found at Albuquerque. "They have, however, been found a few miles north of Albuquerque" (Ligon).]—W. W. COOKE.

NEST.—In trees, bulky and deep, made of sticks, weed stalks, and other coarse materials, lined with bark, roots, grass, and sometimes wool or hair. *Eggs:* Usually 3 to 5, green to olive-buff, irregularly and variously spotted and blotched with browns and grays.

FOOD.—The insect food of the Crow includes grasshoppers, wireworms, cutworms, cattle grubs, white grubs (in some cases almost to extermination), and during insect outbreaks it renders good service. It is also an efficient scavenger. Its injury to sprouting corn may be prevented by coating the seed grain with coal tar. Losses of poultry and eggs may be averted by proper housing and the judicious use of wire netting. Where abundant, however, the Crow destroys numbers of beneficial wild birds and their eggs and sometimes also destroys nut and melon crops.

GENERAL HABITS.—To the student of the life histories of birds the Crow offers rich material, and his intelligence, humor, musical sense, courtship, song, and social instinct have been widely celebrated in bird literature. His social sense is shown most strikingly in the winter roosts where, in the east at least, the birds gather by the thousands at night, flying back in long black lines to their feeding grounds early in the morning.

At Lake Burford, where Doctor Wetmore found several pairs nesting, they came down daily to the shore and "walked about in the open hunting for beetles or flew along low over the rushes searching for the nests of blackbirds. The male Yellow-heads and Red-wings flew up and attacked them savagely but the Crows paid little attention" (1920a, 402).

Local injury to crops has at times made the Western Crow a serious problem. In the State of Washington, L. L. Gardner reports, a flock, estimated at thirty thousand, destroyed valuable watermelon and almond crops. "Efforts of the farmers, which included shooting, use of scarecrows, belling and stringing the trees, had proved unavailing." Poisoning was finally resorted to and drove them from the region, although killing only one per cent of the flock (1926, pp. 460-61).

ADDITIONAL LITERATURE.—ALLEN, F. H., Auk, XXXVI, 112-113, 1919 (music).—BARROWS, W. B., and E. A. SCHWARZ, Bull. 6, Biol. Surv., U. S. Dept. Agr., 1895.—BERGTOLD, W. H., Auk, XXXVI, 198-205, 1919 (distribution in Colorado).—BURNS, F. L., Wilson Bull. No. 5, 1-41, 1895 (monograph).—KALMBACH, E. R., Bull. 621, U. S. Dept. Agr., 1918 (food); Yearbook Sep. 659, U. S. Dept. Agr. for 1915 (winter roosts); U. S. Dept. Agr. Farmers' Bull. 1102, 1920.—MILLER, O. T., Little Brothers of the Air, 236-243 (habits).—TOWNSEND, C. W., Auk, XXXV, 405-416, 1918 (roosts); Auk, XLIV, 550-551, 1927.

PINYON JAY: *Cyanocéphalus cyanocéphalus* (Wied)

PLATE 51

DESCRIPTION.—*Length*: About 10–11.7 inches, wing 5.7–6, tail 4.8. Nostrils small, *entirely exposed*; tail nearly square, *much shorter than wings*. *Adult male*: Dull grayish blue, deepening on head to purplish blue, paler on posterior underparts; throat and chest broadly streaked with grayish white. *Adult female*: Similar, but averaging smaller and usually duller, bluish gray rather than grayish blue. *Young*: Like female but still duller, blue only on wings and tail.

RANGE.—Mainly in Upper Sonoran Zone, in the pinyon and juniper belt, practically resident and breeds from southern Washington and Montana south to western Nebraska, central-western Texas, southern New Mexico, Arizona, and northern Lower California; wanders in fall and winter.

STATE RECORDS.—In southern Colorado the Pinyon Jay breeds up to an altitude of 9,000 feet, and it may do so in New Mexico, but all data at hand seem to indicate a breeding range little if any above 7,800 feet and confined largely to the small pines from which it derives its common name and the seeds of which form its principal food during a large part of the year. It probably breeds not far from Santa Rosa where old and young were seen in flocks June 5–6, 1903, and continued to be common east to Montoya the last of the month (Bailey). [On June 10, 1924, considerable numbers were found among the short cedar canyons that cut out the rim of the Staked Plains about 30 miles southeast of Tucumcari (Ligon).] It probably breeds near Fort Wingate where it was common June 18–29, 1905 (Hollister); and it was found breeding on the San Mateo and Gila River Forest Reserves in 1913 (Ligon). [It was common on the Pinyon Flats in northern Santa Fe County (1918–1922, Jensen). At Lake Burford, June 14, 1918, about 100 appeared, a considerable number of them, young of the year (Wetmore). In Hidalgo County, May 7, 1920, 20 were seen in San Luis Pass (Ligon).] July 8–30, 1913, old and young were found together all the way between Santa Rosa and Lake Burford.

In the fall, near Koehler Junction, they were very abundant in the foothills, especially in September and October, 1913 (Kalmbach). At this season they are among the commonest birds in the mountains of the southern half of the State, going about in large flocks. They were taken at Silver City, August 23, 1914 (Kellogg); and range east to Sierra Grande, August 17, 1903 (Howell); to the White Mountains and the Sacramento Mountains September 2–18, 1902 (Hollister); and even out on the plains north of Fort Sumner September 26, 1902 (Gaut); a few were noted in the Guadalupe Mountains in August, 1901 (Bailey); and they are said to occur occasionally in the vicinity of Carlsbad during migrations (Willett). They occur almost to the southern boundary of the State in the southwestern part since they were found abundant at Deming August 30, 1908, and flocks of 50–100 birds were ranging from 5,200 feet to the summit of the Florida Mountains September 6–8, 1908 (Goldman). But while thus abundant in the fall at these lower altitudes, some individuals at this season ascend high into the mountains. On August 12, 1903, a flock of 6 to 8 was found at timberline, 12,300 feet, on Truchas Peak (Surber); and August 18–25, 1904, they were found on the Culebra Mountains up to 10,700 feet (Bailey).

During the winter they wander over most of the lower mountain slopes of the State and remain at least as high as 8,000 feet, at which altitude in Hondo Canyon both male and female were collected January 9, 1904 (Surber). In the Guadalupe Mountains they were abundant above 5,500 feet January, 1915, and were reported to have come late in July, 1914 (Willett). In Union County, two large flocks were seen November 5, 1915; near the Continental Divide, 12 miles west of Fair View at 8,000 feet, many were seen December 19, 1915; and they were found rather abundant from there to Springerville, Arizona, during the month. [On January 6, 1920, at

Clovis, in extreme eastern New Mexico, far from timber, a great flock was seen flying noisily among the freight cars of the railroad yards (Ligon).]

A bird described from Santa Fe by McCall as *Cyanocorax cassinii* proved to be the same as *Cyanocephalus cyanocephalus*.

NEST.—In colonies, in pinyon pines, junipers, or oaks, generally 5 to 12 feet from the ground; deep, bulky, and compactly built, with a framework of twigs and shreds of bark supporting the deep, well felted cup; made variously of finer shreds of bark, plant fibers, fine rootlets, weeds, wool, hair, dry grass, and a few feathers. *Eggs*: Usually 4 to 5, bluish white, sometimes covered with minute brown specks; at others, wreathed about the larger end with spots and blotches.

FOOD.—Principally pinyon nuts in their season, but also yellow pine and black pine nuts, cedar and juniper berries, small seeds, various wild berries, and insects, especially grasshoppers. On isolated ranches, in narrow valleys where their search for pinyons brings them close to cultivated crops, they sometimes do serious harm; but in general the pinyon nuts supply their principal food (Kalmbach).

GENERAL HABITS.—Long straggling flocks of blue, short-tailed Pinyon Jays trailing over the nut pines and junipers calling softly *pin-yoney pin-yoney* have become delightfully familiar to all field workers in the pinyon belt. But until recently, little has been known of the actual breeding habits of these most interesting Blue Crows, as they are called locally from their resemblance to the crows in many of their actions and habits.

In 1913, west of the Rio Grande, on the San Mateo and Gila River Forest Reserves, Mr. Ligon found them constant residents, wintering in flocks, nesting in colonies, roosting in thick tall pines generally in canyons, and meriting the name of "the most noisy bird of the southwest." He says they nest generally from March 1–31, in gray live oaks among the pinyons, though occasionally in pinyons, even where the oaks can be had. On February 10, 1913, he noted that the birds showed "nesting inclinations, flying two and three together." On February 17, while the ground was still half covered with snow, on the southwest side of Black Mountain in the Datil Forest, at about 7,500 feet he found one nest about complete and others under construction, in scattered scrub oaks on a steep grassy canyon side. There were more than fifty birds in pairs and flocks mingling and scattering and flying about noisily. On March 3, he returned to the colony and found nests in almost all the scrub oaks of sufficient size, but never more than one in a tree. One, half completed, was in a juniper. The birds, slow to leave their nests, finally did so noisily. As it had snowed many times since his first visit, the nests were damp from melted snow. Nearly all contained four eggs, but one had five. The birds were continually going and coming to their feeding grounds where the main body stayed bunched.

On March 4, south of Black Mountain, at about 7,500 feet, Mr. Ligon discovered a second, smaller nesting colony. Many of the eggs were slightly incubated. On March 28, a third colony, of perhaps a



PINON JAY

BIRDS OF NEW MEXICO

of Mexico, far from timber
 out of the railroad yards at
 Santa Fe by McCall as

colaptes auratus.

in pinyon pines, junipers, or oak
 compactly built, with a
 well felted cap; made of
 wool, hair, dry grass
 sometimes covered with
 and with spots and blotches
 locally pinyon nuts in their season
 and juniper berries, small seeds,
 and pin-shoppers. On isolated ranches, in
 them close to cultivated crops
 around the pinyon nuts supply their

GENERAL HABITS.—Long straggled
 pinyon days trailing over the nut trees
 pin-yoney have become
 the pinyon belt. But until now
 the actual breeding habits of these
 are called locally from their resort
 to their actions and habits

west of the Rio Grande, on the
 Forest Reserves. Mr. Lazon found the
 in flocks, nesting in colonies, roosting
 canyons, and meriting the name of "the
 west." He says they nest generally
 oaks among the pinyons, though
 the oaks can be had. On
 showed "nesting inclination"
 February 17, while the
 the southwest side of Black Mountain
 7,500 feet he found
 structure, in which
 were more than fifty birds
 and flying about noisily. On March
 found nests in almost all the scrub oak
 more than one in a tree.

birds slow to leave their nests
 never since his first visit
 and coming to the feeding

Black Mountain
 nesting
 28, a



PINYON JAY

hundred and fifty birds was found on the southeast slope of the Black Mountains at an elevation of about 7,500 feet. Many nests were started, always about eight feet up in scrub oaks. They were made of "coarse sticks with always an inner lining of soft velvety weed" and other materials; and already contained eggs, the birds having just begun to lay. On April 7, on the canyon side at the V+T Ranch, many young Pinyon Jays were out in the trees, and on May 5, at Willow Spring in the Chuchillo Mountains, numerous young and one nest were found. A very late set of eggs was taken June 5, 1882, near Santa Fe (Goss, 1883, pp. 43-44), and on October 7, 1916, in the pinyons twenty-seven miles northwest of Magdalena, Mr. Ligon was surprised to find young just leaving the nest, and others dead in the nests, doubtless killed by the cold rains.

In northern Santa Fe County, Mr. Jensen found that the nesting season extended from February to June. On account of the roving habits of the birds he says it is good luck to find their nests, as they seem never in the same locality twice. On May 18, 1918, he found one nest with fresh eggs and on March 19, 1921, a colony of thirteen nests with large young. On March 15, 1922, he located a colony of seventeen nests, covering about ten acres, all with fresh eggs. The birds nesting in colonies, Mr. Jensen says, usually breed much earlier than the single pairs. The birds sit so close they can be touched.

At Lake Burford in late May and early June, Doctor Wetmore met with small parties of half a dozen or more flying in the open or working through the pinyons. But on June 14, a flock of about a hundred appeared and fed during the last week of Doctor Wetmore's stay among the sage-grown knolls, where they "walked about quickly, holding themselves upright, with heads very high. . . . A considerable number of these birds were young of the year and some, though well grown were still being fed by their parents." In color they were distinctly grayer than the adults and their call note was "a persistent *quay-quay, quay-quay*, that at once attracted attention" (1920a, p. 402).

Throughout the fall, the Pinyon Jay has been reported in large flocks from various localities, its presence depending on the pinyon crop and water. In late September, 1905, from the Mesa Gallinas south to Magdalena, Mr. Hollister found it "probably the most conspicuous bird of the region." From daybreak until about nine o'clock each morning and again toward evening compact flocks of from a dozen to fifty or more were flying about from mesa to mesa. In the Bear Spring Mountains they were especially abundant. In the middle of October, 1909, west of Chloride, Major Goldman found a large flock drinking from Chloride Creek. They "took alarm and flying farther up, many of the birds began drinking again from the stream.

They were abundant in the pinyon belt. Two birds collected had mainly fragments of kernels of pinyon nuts and a small quantity of gravel in their stomachs. In one stomach was an entire kernel apparently just swallowed" (MS). During the month of October and the first part of November, 1904, Mr. Gaut reported great flocks inhabiting the foothill regions of the Manzano Mountains. Occasionally they would appear high up on the mountain sides. Their continual noisy jabbering could always be heard about the places where they congregated. Vast flocks watered all day long, September 30–October 2, at a small watering tank a few miles north of the Ruins of Gran Quivera. They were without doubt the most numerous of any birds inhabiting the timbered parts of the Mesa Jumanes region.

In 1906, we found the Blue Crows abundant during September and October in the nut pine and juniper part of the plateau country between Acoma and Old Fort Tularosa, wherever there was water, and also in some of the dry stretches between water. At Lathrop Spring literally thousands must have come to drink during the hours that we were there, from 2 p. m. to 9. a. m. There was no other water, so far as we could ascertain, within a radius of ten miles. The cries of the birds were constantly in our ears and streams of them were continually coming and going. One flock numbered about a hundred, and at the time other scattered birds were in sight, while a few moments later other flocks were seen issuing from the nut pines.

If a long flight is to be taken, it is said, they go in a compact flock, but otherwise straggle along slowly low over the pinyons and junipers, as they are commonly seen.

In feeding on a sage flat, Doctor Grinnell says, their method of spreading out and working zigzag over the ground in search of insects closely resembles that of the Brewer Blackbird. Large flocks have been seen by Mr. Henshaw engaged in catching insects on the wing.

When feeding on their habitual food, the pinyons, early in autumn, before the frost has released the pine seeds from the cones, C. E. H. Aiken discovered, the Pinyon Jays are obliged to extract them, but later in the season they pick them up from the ground. Feeding in this way they are noisy and restless, "the rear birds in the flock continually rising and flying over the others to the front, and in this manner the whole flock . . . moves as fast as a man can walk" (in Henshaw, 1875, pp. 332-334).

At Fort Garland in October, 1874, Mr. Aiken saw a remarkable performance. There were "probably a hundred of these birds in a dense rounded mass, performing evolutions high in the air . . . sweeping in wide circles, shooting straight ahead, and wildly diving and whirling about, in precisely the same manner that our common pigeons do when pursued by a hawk. This singular performance with intervals

of rest in the pinyons behind the fort, was kept up for about two hours" (in Henshaw, 1875, p. 333).

ADDITIONAL LITERATURE.—CAMERON, E. S., Auk, XXIV, 394-396, 1907.—HENDERSON, JUNIUS, Condor, XXII, 36, 1920 (migrations).

CLARK NUTCRACKER: *Nucifraga columbiána* (Wilson)

DESCRIPTION.—*Length*: About 12-13 inches, length 7.1-8, tail 5.1-5.4. *Adults*: Nasal tufts and face white, rest of body gray (paler and browner in summer); upper tail coverts and central tail feathers black, the rest white, above and below. *Wings*



Photograph by E. R. Warren

FIG. 86. Nutcracker
Caught in passing

glossy black, secondaries broadly tipped with white. Young: Like summer adults but gray paler, black of wings and tail duller, wing coverts with grayish brown tips, feathers of breast sometimes tipped with white giving effect of spotting.

RANGE.—Summers in Boreal Zones of western North America from Bristol Bay, Alaska, Alberta, and Montana south to high mountains of New Mexico, Arizona, and southern California; winters south to southern New Mexico and southern Arizona. Recorded from northern Lower California, Manitoba, North Dakota, Wisconsin, Iowa, Arkansas, and Louisiana.

STATE RECORDS.—No great number of nests of the Clark Nutcracker have ever been found and few of these in New Mexico. [Three nests with young were found by Jensen, July 4, 1921, in a small canyon below Santa Fe Lake, at an altitude of 12,000 feet. As the bird is an early breeder, and eggs have been found in central

Colorado early in March, this was presumably a second nest. A pair were seen by Jensen carrying building material, May 8, 1922, in Santa Fe Canyon at 8,500 feet and May 15, 1921, a pair were feeding young out of the nest in Santa Fe Canyon, at 7,500 feet.] In southern Colorado the young are on the wing by the first week in May, after which both old and young roam at will over the higher mountains. The finding of the birds at any place during May and June—the breeding season of most species—is therefore no proof that they have nested in the immediate neighborhood. The records of the parties of the Biological Survey are, for the most part, later than the middle of June, and so there is no surety that the birds had nested at any of the many places where they were observed. [June 24, 1916, grown young with their parents were found on the north slope of Mount Taylor at about 7,500 feet, and June 24, 1919, grown young still being fed were seen in the Sangre de Cristos. Early in July they were common on the head of the Pecos, all seemingly in families. June 25, 1920, young as large as adults were calling for food, 15 miles southwest of Chloride on the summit of the Black Range at 8,500 feet; and June 26, a family was seen south of Diamond Peak, 22 miles southwest of Chloride, at about the same elevation (Ligon).] In Colorado they nest among the yellow pines at about 7,000 feet and it is probable that they have the same habit in New Mexico. In late March, 1900, and through April and May, they were common at Willis, 7,800 feet, and though no nests were found, probably nested not far distant.

Early in August, 1903, they were common at 11,600 feet at the foot of Pecos Baldy, and on August 6, one was seen coming over the top of the peak at 12,600 feet. In 1904 they were common July 20, at timberline, 12,000 feet, on Wheeler Peak (Bailey). [Several were observed, June 20, 1924, near timberline northeast of Wheeler Peak (Ligon).] They began to leave these highest levels early in August, 1903 and 1904, as the pine nuts began to ripen on the lower mountain slopes. By August 20, 1903, they had worked down to 7,400 feet along the Pecos River, and on August 27 one was seen near Bernal at 6,000 feet, as low an altitude as that at which they usually remain through the winter. In the Taos Mountains they were still seen at timberline as late as the last of September, 1903 (Bailey).

During the winter they are most common along the lower slopes of the mountains at 6,000–8,000 feet. They were seen near Espanola, 6,000 feet, January 2, 1894 (Loring), and one was noted February 22, 1904, near Cieneguilla at 7,000 feet (Surber). In January, 1915, a few were seen in the Guadalupe Mountains at 6,500 feet (Willet).

The species ranges east to Vermejo Park, September, 1903 (Howell); Manzano Mountains, December, 1904, and Mesa Jumanes, September 30, 1903 (Gaut); Capitan Mountains, middle of June, 1899 (Bailey); at timberline on Sierra Blanco September 14, 1902 (Hollister); at Ruidoso September 21, 1898 (Barber). It has been known to occur in November and December as far south as Fort Webster (Henry). As it is not probable that it breeds near Fort Webster, its presence there would indicate that it has a horizontal as well as a vertical migration.

The most southern part of the regular range seems to be the Black Mountains, Socorro County, where it is resident from 7,500 feet upward. A family was seen April 27, 1913, at 7,800 feet, which would indicate that the nesting had been at about that altitude. [Two were seen, May 7, 1920, in San Luis Pass, Hidalgo County, at about 6,000 feet (Ligon).]—W. W. COOKE.

NEST.—In pines, junipers, spruces, and balsams; a platform of twigs bound together by strips of inner bark, surrounding a deep thick-walled cup of shreds of bark, quilted together with grasses and pine needles, sometimes lined with sheep's wool. *Eggs*: 3 to 5, pale gray-green, usually rather sparingly flecked, spotted, and blotched with brown, gray, and lavender, generally heaviest around the larger end.

FOOD.—In summer, the nut-like seeds of the timberline foxtail pines, cedar berries, beetles, hairless tree caterpillars, ants, aerial insects, grasshoppers, and the destructive black cricket; in fall and winter, pinyon nuts and seeds of yellow pine and other conifers. The young are fed by regurgitation on hulled pine seeds.

GENERAL HABITS.—When walking about before you in crow-like pose, the Clark Crow or Nutcracker with his sharply contrasted plumage seems the most conspicuous and striking of birds, but, as Doctor Merriam has pointed out, this coloration is both protective and directive; for his colors "put on in blocks," are "ruptive," and when he is quietly feeding on the ground among the gray rocks, destroy the bird form, the gray of the plumage toning in with the gray of the rocks, the black with the dark shadows. Most especially is this protective at night, when the bird is roosting in trees exposed to owls and martens, for as Doctor Merriam says, "contrasts of gray or white with black are among the most effective of disappearing colors at night, the black resembling patches of night shadow, the gray, the interspaces" (1899, p. 121).

In the high forested mountains the trim Nutcrackers come about camp with the fluffy Rocky Mountain Jays, but while the Jays retreat to the protecting depths of the dense Hudsonian forest, the Nutcrackers fly up into the open, among the wind-beaten dwarfs of timberline. When wanting to descend from these heights, a Nutcracker will sometimes make what James A. Neilson has called his "wonderful plunge flight." One that he saw come up over the top of Laramie Peak in Wyoming, "while yet a thousand feet or more above the valley floor, nose-dived almost to the ground, when he turned upward to check his speed, causing a plainly audible roar of wings" (1926, p. 101).

At our 11,000-foot camp below Pecos Baldy in August, 1903, only a few Clark Crows came into the tree tops, but at our 11,600-foot camp, where the rocky side of the peak rose 1,000 feet above us, and on up to the top of the peak, they were seen commonly, their loud, stirring *kar'r'r*, *kar'r'r*, resounding through the clear mountain air. And here it is that I like best to remember them, for the brave mountaineers seem fitting familiars of the cliffs of the upper reaches.

At camp where they came for food with the Rocky Mountain Canada Jays, they were not nearly so tame as the Jays, although they would come within two or three rods of us, walking around solemnly like Crows, helping themselves freely to food thrown out for them. They fed with the Camp Birds quite peaceably for the most part, but one of them was seen chasing a Jay which had food in its bill, and the Jays usually got out of the way when they found themselves too obviously in it. Well they might, for one of the masterful Clark Crows has been seen chasing a Golden Eagle. Before the nuts and conifer seeds ripen, the Nutcrackers live largely on insects. Two were seen near

camp on a log, running back and forth chasing sphynx moths that were feeding from the larkspurs bordering the log. Later in the season, on our way down the mountains, we found the Nutcrackers on their way down for pinyon nuts.

The following year, when we visited Wheeler Peak amphitheater in the Taos Mountains, on July 20, they were flying about busily at timberline, 12,000 feet altitude, and about the rock slides and grassy slopes above, where grasshoppers were abundant. A few were seen as low as our camp, which was at 11,400 feet, flying back and forth through the spruce woods and hunting for food on the ground. In listening to their voices I was impressed with the immature tones mingled with the calls of the adults. What did that mean from such early breeders? On July 27, while we were breakfasting around the camp fire further evidence was afforded us. One of the birds flew into a small spruce only a few rods away, and looked around with surprising calmness to see what we had to offer. As we were commenting on its unguarded youthful air, in flew another which, from its clearer coloration, we recognized instantly as an adult. The parent was evidently alarmed at finding the young one in such dangerous quarters, and whisked it out of camp before it had time to remonstrate. As we watched the pair, the young one fluttered its wings for food. Moreover, small parties, apparently families, were going about together at timberline the third week of July, so the broods of the year had not all been set adrift in the world. As the birds breed so early—some of them in February—these may well have been second broods, although far enough along to be quite ready for the vertical migration prompted by an early mountain winter and a meager food supply.

Though we saw only a few of the Nutcrackers that had come down from timberline at 12,000 feet to the level of camp—11,400 feet—the last of July, when we descended the mountains we found others ahead of us, as we had the previous year. The first week in August we occasionally heard them at 10,700 feet on Lake Fork, and on August 9 saw several families (?) of four or six flying over Hondo Canyon at 8,200 feet. On August 10 we found them still lower, at 7,900 feet. And as we went north up the range through the nut pine country, we found many flying about in places where there were cones that either they or Pinyon Jays had apparently hammered open to get the delicious little nuts.

But while some of the Nutcrackers had descended to the pinyon belt in early August, a number were found on August 20 in the Culebra Mountains from about 9,000 feet to above timberline, where they seemed to be still eating seeds from the cones of foxtail pines; one was seen on September 8 at about 10,000 feet on the headwaters of the

Brazos, and several were found, October 6, in the Gallinas Mountains, on the yellow pine ridges where they could feed on yellow pine seeds.

The importance of timely vertical migration was well illustrated by a case of which we were told by Mr. Delgar, at Joseph, in the Mogollon Mountains. During a term of unusually severe weather in 1888, when the snow was four feet deep in the mountains and lay thirteen inches deep around Mr. Delgar's house for thirty-one days, a belated Nutcracker came down from the heights and stayed for a time about the stable; but not finding the food offered an adequate substitute for the nuts of the lower levels, to which its fellows had wisely descended, it finally died.

Late in the fall of 1904, Mr. Gaut found the Clark Crows extremely numerous in the Manzano Mountains from the foothill regions up to the summits of the ridges. They would congregate in large numbers about the small mountain springs in the spruce gulches and make the air noisy with their loud harsh notes. Hunting for food, the bold, daring birds would come into camp and, finding his trap line, made it hard to keep it baited with meat (MS).

Like other carnivorous birds, ever on the alert for food, as Mr. Munro points out, their attention is so quickly attracted by a passing coyote or deer that hunters can often take their cue as to the location of game from their excited cries (1919b, pp. 72-73).

In the Cascade Mountains of British Columbia, where Mr. Racey found the Nutcrackers numerous from 5,500 to 7,500 feet, in June, 1924, he was fortunate enough to discover two—apparently second—nests with young in stunted firs, at 6,000 feet (1926, p. 323).

In the Yellowstone, where the hardy birds begin building about the first of February, Mr. Skinner has seen the brooding bird sit through raging snowstorms, often with the thermometer below zero, protecting herself by drawing down her body into her deep, thickly felted nest, only bill and tail showing above its rim. Knowing full well the danger of cold to the eggs or callow young, when approached by man, Mr. Skinner says, a brave mother has been known to submit to capture rather than desert her nest (1916, p. 64).

ADDITIONAL LITERATURE.—BENDIRE, C. E., *Auk*, VI, 226-236, 1889.—BRADBURY, W. C., *Condor*, XIX, 149-155, 1917 (photograph of nests, eggs, and young).

TITMICE, CHICKADEES, etc.: Family Paridae

COMPARISONS.—The family of Titmice, Chickadees, etc.—all birds under seven inches in length—in New Mexico contains representatives of three subfamilies: (1) Titmice and Chickadees, with bill conical, very short and stout, convex, not acute; nostrils entirely concealed, plumage without bright colors; nest in holes in trees; (2) Verdins, with bill longer and more slender than in (1), extremely acute, nostrils not concealed, plumage with bright colors (yellow on head, chestnut on scapulars); nest in trees or bushes, globular, and (3) Bush-Tits, similar to (1) in bill, concealed nostrils,

and plain colors, but slender and very small (under five inches), and tail much rounded and graduated; nest in trees or bushes, long, purse-like.

TITMICE AND CHICKADEES: Subfamily Parinae

In our Titmice and Chickadees the bill is conical, short, and stout, neither notched nor with decurved tip; the nostrils are concealed by dense tufts; the feet are stout, the anterior toes much soldered together at base; "the hind toe with an enlarged pad beneath, forming, with consolidated bases of anterior toes, a broad firm sole" (Coues); the primaries are 10, the first short. The plumage is long, soft, and loose, without bright colors or well-marked changes in sex, age, or season.

COMPARISONS.—The subfamily is divided into the uncrested *Penthestes* (pp. 506-510), and the crested *Baeolophus* (pp. 510-514).

LONG-TAILED CHICKADEE: *Penthestes atricapillus septentrionalis* (Harris)

DESCRIPTION.—*Length*: About 4.7-6 inches, wing 2.5-2.8, tail 2.5-3, tarsus .6-.7. *Adults*: Top of head, nape, and throat glossy black, sides of head snow white; back, scapulars, and part of coverts pale gray becoming buffy gray on rump and upper tail coverts, tail and wings slaty, outer tail feathers edged with white, wings with broad white edgings; underparts white, sides and flanks tinged with buff; legs and feet bluish gray. (In fall and winter more richly colored than in spring and summer.) *Young*: Similar, but black of head duller, without gloss, and texture of plumage much looser.

RANGE.—Breeds mainly in Canadian and Transition Zones in the region of the Great Plains, from central Mackenzie and southwestern Keewatin south to southern Kansas, northern New Mexico, northeastern Utah, southern Idaho, and east-central Oregon; individuals wander south in winter to central Texas.

STATE RECORDS.—[The only nest of the Long-tailed Chickadee yet recorded from New Mexico was found by Jensen, on June 12, 1924, when it contained young. It was in a woodpecker hole in a quaking aspen in Santa Fe Canyon, at 9,000 feet. The species was common in the Sangre de Cristo Range June 18 and 19, 1924 (Ligon).] It seems probable that it nests down to 7,500-8,000 feet, at which altitude on the Pecos it was found April 27, 1900 (?) (Birtwell); it was still abundant July 16, 1903 (Bailey), and July 22, 1883 (Henshaw). It was also noted July 18, 1904, at 7,400 feet on Pueblo Creek near Taos (Bailey). One specimen was taken near the base of the Capitan Mountains July 9, 1903 (Gaut). It must be rare if not accidental in these mountains, for this is the only record and the bird is not known anywhere in the 150 miles between the Capitan and the southern limit of the regular range in the Pecos Mountains.

In the fall the old and young move up into the higher mountains and one was collected August 15, 1903, at 10,500 feet below Pecos Baldy. It is rare, however, above 9,000 feet, though it was found at this altitude August 24, 1904, on the Costilla River (Bailey); on Costilla Pass September 22-27, 1903 (Howell); and a few as high as 9,800 feet at Twining in October, 1903 (Surber). [An adult male was taken at 9,000 feet, 20 miles southwest of Cimarron, October 18, 1919 (Ligon).] On August 16, 1904, it was taken on Red River at about 8,400 feet, while on August 24, 1906, it was seen in the alders and cottonwoods along Santa Clara Creek, 7,500 feet (Bailey); it was common late in August, 1903, in Oak Canyon, in the Ratons about 7,000 feet (Howell); and at Horse Lake, 7,800 feet September 24, 1904 (Bailey).

Through the winter it was common near Arroyo Seco, 8,000 feet, was taken January 19, 1904, in Hondo Canyon at 8,000 feet, and March 9, 1904, at Cienequilla, 6,000 feet (Surber). It was common December 3-9, 1893, at Aztec 5,500 feet (Loring); and not rare October 26, 1908, at Fruitland 5,000 feet (Birdseye). It is not



From Biological Survey

FIG. 87. Chickadee (*Penthestes atricapillus atricapillus*)

A bird in the hand worth two in the bush

probable that the species breeds at either of these latter places, the birds being visitors from the neighboring mountains of Colorado, where they breed commonly at 7,000 feet.—W. W. COOKE.

A chickadee described from New Mexico by Baird as *Parus albescens* proved to be the same as *Penthestes atricapillus septentrionalis*.

NEST.—In holes in trees or stumps, lined with soft materials, as hair, fur, and feathers. Eggs: 6 to 8, white, sprinkled with reddish brown dots and spots.

FOOD.—The vegetable matter eaten by the chickadee, less than half its total, is composed largely of seeds, mainly those of pines; while the animal matter includes small caterpillars, moths and their eggs, beetles, ants, wasps, bugs, flies, grasshoppers, and spiders. Among the injurious insects eaten are tent caterpillars, cankerworms, and plant lice, hibernating alfalfa weevils, and codling moth larvae. Stomachs of the Long-tailed taken in New Mexico contained insect and small green and red eggs. Next to woodpeckers, titmice are probably the most important enemies of the codling moth. Their habits of searching every nook and cranny, however small or difficult of access, and the thorough way they go over trees and stumps, enable them to find the favorite hibernating quarters of the larvae (McAtee).

GENERAL HABITS.—Long-tailed Chickadees, with the solid black cap and throat are often found along stream or river bottoms and were seen by us in September with a busy throng of nuthatches, vireos, migrating warblers and others, hunting through the sunny tops of cottonwoods.

In winter, Doctor Coues says, the characteristic "*chickadee*" note is the only one heard, but in spring, at the approach of the breeding season, "they utter a peculiarly soft, long-drawn note of two syllables," which he considers somewhat different in intonation from the *phoe-be* note of the eastern chickadee (1874, p. 21).

ADDITIONAL LITERATURE.—FINLEY, W. L., American Birds, 15-22, 1907.—TRAFTON, G. H., Methods of Attracting Birds, 20-21, 1910.

MEXICAN CHICKADEE: *Penthestes sclateri* (Kleinschmidt)

DESCRIPTION.—*Length: 4.7-5.2 inches, wing 2.6-2.8, tail 2.2-2.4, tarsus .7. Adults: Top of head, nape, and throat jet black, with a faint gloss, sides of head snow white; rest of upperparts plain deep olive-gray or mouse-gray, wings and tail slaty with gray edgings; black of throat spreading fan-shape over chest, median lower underparts white, sides and flanks olive-gray, paler and more olive than back. (Winter adults more strongly tinged with olive.) Young: Similar, but black of head duller.*

COMPARISONS.—The Mexican Chickadee is similar to the Long-tailed but darker, the sides and flanks dark gray like the back, instead of being tinged with buff, and the black of the throat patch extended. (See p. 506.)

RANGE.—Mountains of southern Arizona, southwestern New Mexico, and over much of Mexico to Oaxaca.

STATE RECORDS.—The Mexican Chickadee was taken in the San Luis Mountains July 19, 1892, and September 29, 1893, at about 7,000 feet (Mearns); and was found rather common among the pines of the Animas Mountains, 7,500-8,000 feet, August 1, 1908 (Goldman). These constitute the only State records of this Mexican species, which barely reaches to New Mexico and to extreme southeastern Arizona in the Chiricahua Mountains.—W. W. COOKE.

MOUNTAIN CHICKADEE: *Penthestes gambeli gambeli* (Ridgway)

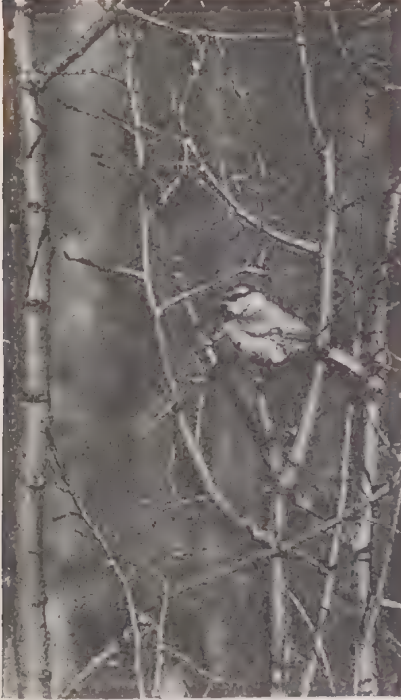
DESCRIPTION.—*Length: 5-5.7 inches, wing 2.7-3, tail 2.4-2.6. Adults: Top of head black, interrupted by white line over eye, sides of head white; rest of upperparts deep olive-gray or mouse-gray; wings and tail darker with pale gray edgings; throat black, median lower underparts white; sides, flanks, and under tail coverts, pale olive-gray; legs and feet bluish gray. (In winter, white superciliary stripe broader, feathers of forehead edged with white, gray parts more buffy.) Young: Similar to adults, but black of head duller, white superciliary less distinct, and wing edgings faintly tinged with brownish buff.*

COMPARISONS.—The white line over the eye easily distinguishes the Mountain from the Long-tailed and Mexican Chickadees. (See p. 506.)

RANGE.—Canadian and Transition Zones in western mountains from southern Idaho and east-central Montana south in mountains of western Texas, New Mexico, Arizona, and California.

STATE RECORDS.—The Mountain Chickadee is the most abundant of its family in New Mexico and is widely distributed. As its name implies, it is a bird of the mountains, where it nests through a wide range of altitude. In Colorado, where it nests up to 10,000 feet, at least, and probably to 11,000 feet, it is known to nest at 6,500 feet near Bayfield (Cary), and down to 6,000 feet at Trinidad (Cooke). On the east side of Pecos Baldy, July 18, 1919, young were out in the low spruces at timber-line and others were being fed in the nest (Ligon). In the Santa Fe region it nests from 7,500-10,000 feet. A nest with eight fresh eggs was found on May 14, 1921,

in a bluebird box eight miles east of Santa Fe, and on May 30, 1921, another with seven eggs, also in a box, was found in the same locality. On June 5, 1921, two nests were found, one with eight well incubated eggs in a pine stump in the Santa Fe Canyon, and another with seven fresh eggs near the Elks' Cabin (Jensen).]



Photograph by E. R. Warren

Fig. 88. Mountain Chickadee

It was common at Glorieta, 7,400 feet, July 7-10, 1903 (Bailey); a common breeder at Willis, 7,800 feet (Henshaw); common in the San Pedro Mountains, July 8, 1889, when a flock of young was found among the spruces (Bailey); and found at Halls Peak, 8,000 feet (Barber); in the Chuska Mountains (Gilman); [and at Lake Burford, where a nest with five nearly fledged young was seen, June 16, 1918 (Wetmore).] At the head of the Rio Mimbres late in May, 1906, it was found among the junipers at about 6,500 feet as well as up in the pines, and it was common among the yellow pines of the Capitan Mountains June 14, 1899 (Bailey); it was common at Clouderoft, 9,000 feet, July, 1909 (Green); and breeding among the pines on the Pinos Altos Mountains, July 8, 1894 (Fisher).

In the fall both old and young range up to timberline even on the highest mountains as on Pecos Baldy (Bailey); while in the mountains above Taos on October 10, 1903, it was found common from 10,000 feet to timberline and one specimen was taken at 12,500 feet, a thousand feet above timberline (Surber). Sometimes at this season, as well as in winter, it descends to

the lower levels—to 5,000 feet at Shiprock, November 7, 1908 (Birdseye); to the same altitude at Albuquerque October 14, 1900 (?) (Birtwell); to 5,500 feet in the Guadalupe Mountains, January, 1915 (Willett). It also ranges east to Halls Peak (Barber); Fulton (Bailey); Corona and Jicarilla Mountains (Gaut); and Ruidoso in the White Mountains (Hollister).

As the name *Penthestes gambeli* is a substitute for *Parus montanus*, taken during the early explorations "one day's journey west of Santa Fe," there is no type.

The type specimen of the subspecies called *thayeri* by Birtwell¹ was taken at Albuquerque, December 27, 1900, but on investigation the darkness of the underparts, upon which it was described, proved to be from charred wood, so the form was not recognized.—W. W. COOKE.

NEST.—In an old woodpecker hole, natural cavity, or bird box, usually not over 15 feet from the ground; generally lined with rabbit fur. Eggs: 5 to 9, plain white or spotted with reddish brown, chiefly around the larger end.

GENERAL HABITS.—When the Mountain Chickadee clings upside down to a pine twig, as it is so fond of doing, the distinguishing white line over the eye shows to good advantage. But this line is not always

¹ Birtwell, F. J., Description of a supposed New Subspecies of *Parus* from New Mexico, Auk, XVIII, 165-167, 1901.

of the same width. A member of an inquiring flock that came into a nut pine within three or four feet of me apparently raised its eyebrows in its curiosity, and in doing so actually widened the white superciliaries till its black cap was narrowed to an insignificant black line. On the other hand, the abrasion of the feathers previous to the molt makes the white stripe narrower than in the fresh fall plumage. In the August molt, a specimen taken had new wing and tail feathers although its body was still pinfeathery.

Under the heading, Mountain Chickadee with an Adopted Family, Mr. Jensen writes of finding one of the birds in a bird box incubating six eggs of her own and three of the Gray Titmouse. He took out the chickadee's eggs and some time later found the foster mother busy feeding four young Titmice (1925d, p. 593). It is good to know that boxes may attract these delightfully friendly little house hunters around our homes.

They may be met with almost anywhere in the forested mountains. In Santa Clara Canyon, where we found them in the oaks, nut pines, and junipers of the south slope, down along the creek, in the turns where the sun came in, they were in the alders and birches together with migrating warblers, vireos, and flycatchers. But they are found in the high, dark, coniferous forests as well, and it is here that their cheery notes are most gratefully heard. In variety of note they almost equal the Tufted Titmice. Their clear *phoe'-be* whistle is given occasionally, and there is a complicated guttural outburst suggesting *skit'-tle-dee* or *skit'-tle-little-dee*; also the clear *phoe'-be* followed by a guttural *chick'-ah*, *chick'-ah-dee*. Besides these, there is an endless variety of small conversational notes, all doubly welcome to the ear in the silent forest.

GRAY TITMOUSE: *Baeolophus inornatus griseus* (Ridgway)

PLATE 52

DESCRIPTION.—*Length:* About 5.7–6.1 inches, wing 2.8–3, tail 2.4–2.7, bill .4–.5, tarsus .8–.9. *Crested.* *Adults:* Plain, unmarked; upperparts light gray; underparts whitish gray, becoming whitish on belly.

RANGE.—Breeds, and is presumably resident, in Upper Sonoran Zone in foothills of the mountains of the arid interior, from desert ranges east of the Sierra Nevada in California to Idaho, Wyoming, and the eastern foothills of the Rocky Mountains in Colorado south to southeastern New Mexico, southern Arizona, and the desert ranges of the Colorado Valley.

STATE RECORDS.—The migration of the Gray Titmouse is about as restricted as that of any bird in New Mexico; it is practically resident wherever found and its slight movements are to be considered wanderings rather than migration. It ranges over the whole mountainous part of the State east to the Guadalupe Mountains (Fuertes); Capitan Mountains, Corona, in Gallinas Mountains (Gaut); Santa Rosa Wells to Montoya, June 9–20, 1903, 4,600–4,700 feet (Bailey); near Koehler Junction, September 22, 1913 (Kalmbach); and is common in Upper Sonoran Zone,



From Biological Survey

TITMOUSE (*Baeolophus inornatus inornatus*)
One of a sharp-eyed family looking for his dinner

except on the plains (Bailey). While 4,600 feet is about the lowest altitude at which it occurs in the State, it was found among the junipers and nut pines [at about 5,300 feet southeast of Albuquerque, July 22, 1919 (Ligon)]; and to 6,500 feet on Mesa Yegua and up to 7,500 feet at Glorieta, July 7-10, 1903 (Bailey). It was traced in the Rio Grande Valley, north nearly to Abiquiu, 6,500 feet (Bailey), and to near Questa at 7,000 feet (Gaut), but at each place was confined to the pinyon pines and the junipers. [In northern Santa Fe County it seems most common from 6,500-8,000 feet, where fresh eggs are found May 1-June 10 (Jensen, 1922).]

Much of west-central New Mexico seems to be too high for this species, but it is abundant in the Chuska Mountains (Gilman), and not uncommon at Fort Wingate, where young just out of the nest were noted July 2, 1892 (Fisher). A few were seen among the pinyons between Gallup and Zuni, July 24-26, 1909 (Fisher); and it is common in southwestern New Mexico north to Old Fort Tularosa, 6,800 feet, October 10-13, 1906; to the upper junipers on the Mimbres, 6,500 feet (Bailey); and to the pinyons of the Bear Spring Mountains, September 22, 1905 (Hollister). It was noted at Fort Bayard September 10, 1914 (Rockhill). It was noted but not common at 7,000 feet on the high mesas between Acema and Lathrops Spring, September 27-October 1, 1906. It ranges south to Cactus Flat, November 6, 1906 (Bailey); and to the Burro Mountains 6,500-7,000 feet, September 15-23, 1908 (Goldman), being found here among the oaks. In the Guadalupe Mountains it was seen occasionally in January, 1915 (Willett).—W. W. COOKE.

NEST.—In holes in trees or stumps or in bird boxes in pinyon pines, made of soft felted materials and feathers. *Eggs*: 6 to 8, plain white.

FOOD.¹—Unlike most of the titmice, *Baeolophus inornatus* in California eats less animal than vegetable food, the proportion being 43 per cent of animal to 57 per cent of vegetable. Of the vegetable matter, fruit amounts to about a third, much of it refuse. Leaf galls, seeds of poison oak, weed seeds, and mast also are included. Of the animal food, bugs make up 12 per cent, nearly half being the black olive scale, and the rest partly leaf hoppers, jumping plant lice, and tree hoppers. Caterpillars amount to nearly 11 per cent. Of the beetles, which form nearly 7 per cent, all are harmful and the weevils are the long-snouted kind that bore into nuts and acorns. Ants, wasps, grasshoppers, and spiders are also eaten. The insects it eats are practically all harmful and the scales exceedingly so. Moreover, its habit of foraging in trees enables it to capture some of the worst enemies of fruit and renders its work in this direction invaluable. If the Gray Titmouse, the bird of New Mexico and the arid interior, should ever become abundant in fruit-growing sections, it would be well to plant wild fruits to protect the cultivated and so wholly profit by its presence.

GENERAL HABITS.—The attractive Gray Titmouse with its prettily crested head and soft Quaker-gray plumage is intimately associated with pleasant camps in the low, sun-filled junipers and nut pines of the mesas, the low desert ranges, and the foothills of the Rocky Mountains. And in these low sunny groves the wayfarer hears many of its small notes, delightfully homelike and conversational in tone, including its rapid *wheed-leah*, *wheed-leah*, *wheed-leah*, repeated three or four times in quick succession, and its chickadee-like *tsche-de-dee*, *tu-we-twee-twee*, sometimes used to preface its loud clear *pe-to* calls. But its

¹ No statistics are available for the Gray Titmouse but investigations have been made of the food of the closely related Plain Titmouse.

most conversational notes are best heard at the nest, where you may perhaps listen to a variety of small talk, such as the infantile, lisping notes of the hungry, brooding bird coaxing her mate to feed her; the tender note of her mate calling her to come to the door for the food he has brought; pretty conjugal notes of greeting and farewell;



MAP 39. GRAY TITMOUSE
Yearlong records in Upper Sonoran Zone

the chattering scold and cries of anger, anxiety, and terror, heard when enemies threaten; sharp notes of warning to the young, and wails of grief when harm has come to the nestlings. Such notes, given emphasis by vivacious, eloquent movements and gestures, interpret the thoughts and feelings of these intense little feathered folk, almost as clearly as elaborate conversations do the emotions of less demonstrative human beings.

ADDITIONAL LITERATURE.—BAILEY, F. M., Educational Leaflet 71, Nat. Assoc. Audubon Soc.—MERRIAM, F. A., A-Birding on a Bronco, 175-183, 1896.—TRAF-
TON, G. H., Methods of Attracting Birds, 44, 84, 87, 1910.

BRIDLED TITMOUSE: *Baeolophus wollweberi annexus* (Cassin)

DESCRIPTION.—*Length:* 4.5-5 inches, wing 2.6-2.8, tail 2.4-2.6. *Adults:* Crown deep gray, crest, and back of head black, sides of head white, marked or bridled with black; rest of upperparts plain grayish; throat black, median underparts grayish white, becoming olive-buffy posteriorly (less or wanting in summer). *Young:* Chin blackish but throat grayish, and bridling less sharply defined.

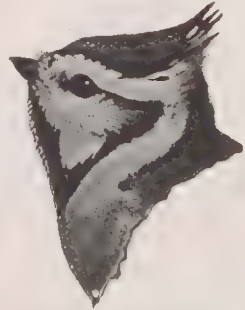
RANGE.—Apparently resident. Breeds mainly in mountains of Upper Sonoran Zone of southern Arizona and southwestern New Mexico south over the highlands of Mexico to Sonora and Chihuahua.

STATE RECORDS.—The southwestern part of New Mexico is the northeastern limit of the range of the Bridled Titmouse; it has been found here in the San Luis Mountains (Mearns); among the oaks of the basal slopes of the Animas Mountains, 5,500-6,500 feet, and on the northeast slope of the Burro Mountains, 6,000-7,000 feet (Goldman); at Silver City (Marsh); Pinos Altos Mountains (Fisher); Fort Webster, once, May 10, 1853 (Henry); [several were seen on June 21, 1926, 4 miles west of Cloverdale, Hidalgo County (Ligon)]; Gila (Goldman); Glenwood (Bailey); Cooney (Barrell); and north to the San Francisco Canyon above Alma, where two small flocks were seen October 14, 1906 (Bailey). The species is non-migratory.—W. W. COOKE.

NEST.—In cavities of oaks, lined with soft materials. *Eggs:* 5 to 7, plain white.

GENERAL HABITS.—The sharp-pointed black crest and the black throat and face markings of the Bridled Titmouse, besides lending it charm and distinction, may well be a family convenience in the dull-colored oaks where other dull-colored titmice disport themselves. Small flocks of about half a dozen each, probably families, were eagerly met with among the blue oaks, junipers, and nut pines of San Francisco Canyon, where they were associated with Lead-colored Bush-Tits and Gray Titmice. Other small flocks of the prettily marked Bridled were later discovered in sycamores in the open valley, at the junction of White Water Creek and San Francisco River; but they are more characteristically birds of the oak country. In the Huachuca Mountains of Arizona, Mr. Swarth has found them abundant in the oak regions, late in August, going about in flocks of twenty or twenty-five birds (1904, p. 62).

Active, sprightly little bodies, they go flitting about the trees singing a song easily recognized by its chickadee inflections, though thin and tinkling—at least in November. One that I watched hopped up the branches of a tree quite in the manner of a jay climbing his tree ladder.



From Handbook (Fuentes)
FIG. 89. Bridled Tit-
mouse



MAP 40. BRIDLED TITMOUSE
Triangles mark breeding and yearlong records

VERDINS: Subfamily Remizinae

VERDIN: *Auriparus flaviceps flaviceps* (Sundevall)

PLATE 53

DESCRIPTION.—Length: 4–4.6 inches, wing 1.9–2.1, tail 1.7–2. *Adults:* Whole head dull yellow, forehead sometimes tinged with orange-rufous; body brownish gray, wings and tail darker with pale edgings, shoulder patch reddish brown; posterior underparts becoming whitish, median line sometimes faintly tinged with yellow; legs and feet bluish gray. (Female slightly duller in color, especially the yellow of head.) *Young in juvenal plumage:* Similar to adults but without yellow of head or reddish brown of wing coverts. After first molt, it becomes indistinguishable from the adults.

RANGE.—Lower Sonoran desert and arid regions from southeastern California, southern Nevada, southwestern Utah, northwestern Arizona, southern New Mexico, and southern Texas south to Tamaulipas, Coahuila, Durango, and northern Sonora.



VERDIN

MALE
FEMALE



MAP 40. BRIDLED TITMOUSE
Triangles mark breeding and yearlong records

VERDINS: Subfamily Remizinae

VERDIN: *Auriparus flaviceps flaviceps* (Sundevall)

PLATE 53

DESCRIPTION.—Length: 4–4.6 inches, wing 1.9–2.1, tail 1.7–2. *Adults:* Whole head dull yellow, forehead sometimes tinged with orange-rufous; body brownish gray, wings and tail darker with pale edgings, shoulder patch reddish brown; posterior underparts becoming whitish, median line sometimes faintly tinged with yellow; legs and feet bluish gray. (Female slightly duller in color, especially the yellow of head.) *Young in juvenal plumage:* Similar to adults but without yellow of head or reddish brown of wing coverts. After first molt, it becomes indistinguishable from the adults.

RANGE.—Lower Sonoran desert and arid regions from southeastern California, southern Nevada, southwestern Utah, northwestern Arizona, southern New Mexico, and southern Texas south to Tamaulipas, Coahuila, Durango, and northern Sonora.



VERDIN

MALE
FEMALE

STATE RECORDS.—The lower parts of southern New Mexico constitute the northern limit of the range of the Verdin in the State. [Fairly common in the Rio Grande Valley as far north as San Marcial, in the Tularosa Valley to Alamogordo, and in the Pecos Valley to Carlsbad (Ligon 1916-18).] It is non-migratory and has been found north to the Gila (Stephens); Apache (Anthony); Mesilla Park (Merrill); Cuchillo Spring, Sulphur Pass in the San Andres Mountains, east of Cutter, nesting June 13, 1913; Tularosa Flats, and west side of Sacramento Mountains a few miles west of Cloudercroft 6,400 feet, June 17, 1913 (Ligon); Carlsbad Bird Reserve, January, 1915 (Willott).

Young in the nest were noted on June 2, 1876, on the Gila (Stephens); and old birds still feeding young July 26, 1901, at Carlsbad (Bailey). [A nest on Cuchillo Creek, 2 miles east of Cuchillo, May 25, 1917, had three fresh eggs (Ligon).]—W. W. COOKE.

NEST.—In thorny bushes, mesquite, cholla cactus, catsclaw, all thorn, or blue thorn, globular, about the size of a large cocoanut; entrance often through slanting neck on one side; made of small sticks, thorny twigs, coarse grass stems, leaves, and weeds, thickly lined with feathers and down. *Eggs*: Usually 4 or 5, bluish or greenish white, speckled and sometimes blotched, chiefly around larger end with reddish brown.

GENERAL HABITS.—In the valleys and canyons of the Carlsbad Cave region, as in other parts of southern New Mexico, Mr. Bailey found the delightful little Verdin, "a true desert dweller with no fear of heat, cold, or thirst," living all the year around, sleeping on cold winter nights in its warm nest and feeding on insects or berries as the season provided.

In the desert brush above the Pecos, near Carlsbad, we found two young birds—lacking the yellow head and chestnut shoulder patch of the adults—chasing each other around and around an interesting old nest. Their call notes as they skipped about switching their tails were surprisingly loud, suggesting a finch or some larger bird. Young birds, when seen in Lower California by Mr. Huey, following their parents about, were "begging, with *high-pitched voices*, for food" (1927, p. 37).

At Mesilla Park, where the little yellow head breeds sparingly, Professor Merrill says it nests along arroyos on the mesa, in Apache plume, and in Condalia bushes.

Like the Cactus Wren and the Western Winter Wren, the Verdin builds roosting winter nests. In Cactus Wren and Verdin country in southern Arizona, out of fifteen Verdin nests that I found in one small tract, ten showed signs of winter occupation and nine were found to contain roosting birds, the small occupants being flushed at intervals from 4.28 p. m. until after sunset, at various dates from December 9, 1920, to March 13, 1921. Two of the little birds seen going to their nests went half an hour or more before sunset, when it was light enough to be seen by Sharp-shinned Hawks and any other too observant neighbor. But in these nests and others examined in the vicinity the

side door of the nest was hidden under a projecting roof, which slanted down from the doorway far enough to cloak the goings and comings of the small birds as they quietly and quickly slipped in and out. Then, too, the nests were largely under thorny trees rather than on top of them. Of the fifteen examined, all but one, which was in a cats-claw,



MAP 41. VERDIN

Shaded areas show general range. Triangles mark breeding and yearlong records

were in blue thorn bushes and "nearly all of these bushes stood under good-sized, more or less isolated mesquite trees. Whether this selection of nesting site was on the protective principle that two thorn trees are better than one, or whether the shading and extra, thorn-supplying mesquite, which seemed to me such a happy addition, was quite irrelevant to the Verdin, an easily accessible long-thorned zizyphus being its only requirement, must remain a matter for speculation."

The nests were mainly the inconspicuous greenish gray of the blue thorn. Two disused nests brought to camp and carefully examined showed a three-fold structure made with great skill. The outside shell of the handsome ball was made of thorny zizyphus, or zizyphus and catsclaw twiglets, while the inner nest was made of mesquite or catsclaw leaves, leaf stems, and sometimes catkin stems, remarkably felted throughout with spider web; the nest chamber in turn being lined thickly with feathers, in one case mainly quail but some chicken, making in all a large handful (1923c, pp. 20-21).

In the mesquite and screw-bean thickets of the Colorado desert, Mr. Gilman thought both the male and female built roosting nests. Two were usually found near together, those of mated birds he infers, the nest builders having failed to grasp the advantages in labor and warmth of one family roof tree. The nest of the male, he states, is smaller, less elaborate, and less thoroughly lined than that of the female, whose winter nest differs but little from her breeding nest (1902, pp. 88-89). The Verdins appear to be paired off in February, Doctor Grinnel finds, each pair having "a particular beat or forage area, focusing at one or more nests."

These little desert birds would seem almost independent of water, nests having been found at least ten miles from any known water. The question is whether by means of their insect food and berries they are made largely independent of other liquid.

Easy to watch, from unobtrusive distance, these charming little birds are among the most interesting and attractive in New Mexico, offering the patient observer rich rewards of pleasure and new material. As Mr. Bailey says, "The every day life and all-the-year habits of these tiny denizens of the desert, if well known, would make a fascinating chapter on desert life" (1928a, p. 161).

ADDITIONAL LITERATURE.—BAILEY, F. M., Condor, XXV, 20-21, 1923 (nests).

BUSH-TITS: Subfamily Psaltriparinae

LEAD-COLORED BUSH-TIT: *Psaltriparus plumbeus* (Baird)

DESCRIPTION. — *Length:* About 4.1-4.6 inches, wing 2-2.1, tail 2.3-2.5, tarsus .6-.7.

Adults: Upperparts plain olive-gray or smoke-gray, wings and tail darker, with light gray edgings; sides of head brown; underparts pale gray (whitish in mid-



From Handbook of Western Birds

FIG. 90. Nest of Bush-tit (*Psaltriparus minimus*)

A large nest and its small tireless builders

summer); iris brown or blackish or pale yellow or yellowish white (sometimes present only as an outer ring and concealed by eyelids—Ridgway). *Young*.—Similar, but with less brown on the sides of the head.

RANGE.—Upper Sonoran Zone of arid interior from eastern Oregon and western Wyoming south to western Texas, northern Sonora, and southeastern California.

STATE RECORDS.—The lower and middle parts of the mountains are occupied by the Lead-colored Bush-Tit, which extends east to the Guadalupe Mountains (Bailey); Salinas Peak (Gaut); Montoya and Mesa Yegua (Bailey); Santa Fe (Henshaw); Camp Burgwyn (Anderson); Hondo Canyon and Culebra Mountains (Bailey); and Oak Canyon (Howell). It breeds from as low as 4,600 feet in the junipers at Santa Rosa (Bailey); to 7,000 feet at Fort Wingate (Henshaw); 7,400 feet at Glorieta (Bailey); and 8,000 feet on the summit of the Big Hatchet Mountains (Mearns). [It is most abundant at 6,000 feet (Ligon, 1916–1918).] Eggs were taken on April 24, 1885, at Silver City (Marsh); and young found in the nest on May 22, 1892, on the summit of the Big Hatchet Mountains (Mearns); while at Santa Rosa, June 5, 1903, some birds were still nest-building. [A freshly built nest was found in Garden Canyon a mile or so from the Carlsbad Caves, April 10, 1924 (Bailey); and a nest was found May 17, 1917, at Chloride, at 6,200 feet, with seven well incubated eggs (Ligon). Two nests were found near Hondo Canyon, 5 to 6 miles southeast of Santa Fe, one with six heavily incubated eggs, May 24, 1924, and one with six young ready to fly, June 6, 1924; another nest with six fresh eggs was found about 3 miles south of Santa Fe, May 4, 1926 (Jensen).]

After the nesting season, the species assembles in flocks and roams the mountain sides to Oak Canyon, in the Ratons, September 5, 1903 (Howell); to 7,700 feet near Taos, September 22, 1903 (Bailey); to 7,600 feet in the Big Hatchet Mountains (Goldman); to 8,000 feet in Arroyo Hondo, August 13, 1904 (Gaut); and to 9,000 feet on a local hot slope among the nut pines and junipers in the Costilla River Valley, August 25, 1904 (Bailey).

During the winter it descends to Shiprock, 5,000 feet, February, 1907 (Gilman), and to Redrock, 4,000 feet on the Gila River (Goldman). It was common in flocks at 6,500 feet near Cieneguilla, February 15, 1904 (Surber); in the Guadalupe Mountains at about 6,500 feet, January 13, 1915 (Willett); and at 6,000 feet on Salinas Peak of the San Andres Mountains December 15, 1902 (Gaut). It remains through the winter at this same altitude at Silver City (Hunn) and Fort Webster (Henry).—W. W. COOKE.

NEST.—(In Chisos Mountains, Texas) 12 to 15 feet from the ground, in a nut pine, a greenish gray bag 6 or 8 inches long, made of lichens, oak leaves, oak flowers, and catkins, woven with cocoon silk. Other nests, built in junipers, cottonwoods, etc. *Eggs*: 4-6, white.

Food (of California Bush-Tit).¹—Insects and spiders that live on trees make up four-fifths of its food, and most of these are harmful. Bugs make 44 per cent of the whole, mainly plant-lice and bark-lice or scales (notably the large black olive scale)—the most destructive to fruit trees. Codling moth larvae are also eaten. Its vegetable food is of almost no economic importance. Bush-Tits are a valuable asset and should be protected and encouraged in every way (Beal).

GENERAL HABITS.—Except when nesting, the diminutive Lead-colored Bush-Tits always seem to be seen in passing, for they go about in flocks through the nut pines, junipers, and other trees and bushes of the low country, calling as they go. This constant calling, like that

¹ Beal, F. E. L., Birds of California in Relation to the Fruit Industry, Biol. Surv., U. S. Dept. Agr., Bull. 30, 74–80, 1907.

of birds migrating at night, doubtless enables them to keep in close flocks while traveling through thickets, where their small, dull colored bodies would easily be lost sight of.

In watching the passing flocks of Bush-Tits it would be well to notice the color of their eyes, for, as Mr. Ridgway discovered when on



MAP 42. LEAD-COLORED BUSH-TIT

Triangles mark breeding and yearlong records in upper Sonoran foothill country

the Wheeler Survey (1877, p. 414), and as the Micheners have recently found when banding them, they vary in color of iris from almost white to dark brown (1928, pp. 134-135), apparently, Grinnell and Storer believe, without relation to age, sex, or season (1924, p. 580).

The little birds were common among the junipers at Santa Rosa on June 5, 1903, going about for the most part in families; but one pair was just beginning to build in a juniper, gathering wool that the sheep

had rubbed off on the trees. They worked rapidly, their nest being four inches long one day and eight the next, arched over at the top, with the entrance framed in, though it was still so filmy that the body of the worker could be seen inside. Examined closely it was found to be made mostly of wool with small woolly leaves and oak tassels interwoven. In an old nest of a related Bush-Tit found in a live oak in southern California, I once counted over three hundred tiny feathers in addition to a mass of fine gray moss and oak blossoms (1902a, p. 461). When encountered in the field, as Mr. Bailey says, "the old birds, gray mites that they are, make frantic efforts to drive away intruders, either from the nest or from their families of young as they are led about in the bushes" (1928a, p. 160).

ADDITIONAL LITERATURE.—FINLEY, W. L., American Birds, 105-111, 1907; Condor, VII, 91-95, 1905 (young); Educational Leaflet 40, Nat. Assoc. Audubon Soc.—GRINNELL, JOSEPH, Condor, V, 85-87, 1903 (call notes).

LLOYD BUSH-TIT: *Psaltiriparus melanotis* llóydi Sennett

DESCRIPTION.—*Length*: Adult male (skin) about 4 inches, wing 1.9-2, tail 2.1-2.2, bill .3; tarsus .6. Female about the same. *Adult male*: Top of head slate gray, cheeks and narrow nuchal collar, black (glossy greenish); rest of upperparts plain deep olive-gray; wings and tail smoke or mouse-gray with pale edgings; chin black, median underparts white, sides washed with grayish brown; thighs and under tail coverts buffy whitish; iris pale yellowish. *Adult female*: Similar, but black of sides of head usually partly or wholly replaced by brown, and underparts dull buffy.

RANGE.—Mainly in Upper Sonoran Zone of southeastern desert region from southeastern Arizona, southern New Mexico, and western Texas (mountains between the Pecos and Rio Grande rivers) south into Chihuahua and Sonora.

STATE RECORDS.—A full plumaged adult male was taken in the San Luis Mountains, July 19, 1892 (Mearns), and is now in the collection of the United States National Museum. The species probably occurs at other places in southern New Mexico, but the difficulty of distinguishing between the females and young of this form and *plumbeus* prevents a certain identification of other specimens in the collection that probably belong to this species.—W. W. COOKE.

NUTHATCHES: Family Sittidae

Subfamily Sittinae

While tree trunk creepers, the Nuthatches, unlike the closely related Brown Creepers, habitually walk head down or climb around without help from the short soft tail, "the whole tarsus being often applied to the support." Well adapted to their life, their plumage is compact, their bodies flattened, their tails and legs short, and their toes all long, with large, much curved, compressed claws. Their bills are strong, compressed, nearly straight, their tongues



FIG. 91. Nuthatch (*Sitta carolinensis carolinensis*)

are horny, acute, and barbed. Although chiefly insectivorous, they feed also on hard fruits, and are named from their habit of sticking nuts and seeds in cracks in bark and hammering till they break the shell (Coues).

ROCKY MOUNTAIN NUTHATCH: *Sitta carolinensis nelsoni* Mearns

DESCRIPTION.—*Length:* 5.9 inches, wing 3.7, tail 2.2. Bill large, convex. *Adult male:* Top of head and hind neck solid black (with greenish gloss) in striking contrast to white of sides of head; upperparts bluish gray, tail with all but middle feathers



Photograph by G. R. Littleton

FIG. 92. Young Rocky Mountain Nuthatches

Not long from the nest but apparently enjoying their new home

black, crossed by a broad subterminal band of white, broadest on outside feathers; wings bluish gray, with black and white markings; underparts grayish white, shaded with gray on sides and flanks, and tinged with rusty on flanks and lower belly. *Adult female:* Similar, but black of head veiled with grayish or bluish gray. *Young:* Similar to same sexes of adults but black of head and hindneck duller, edges of greater wing coverts and secondaries brownish.

RANGE.—Breeds mainly in Transition Zone of interior from southern British Columbia, central Alberta, and western Manitoba south (between Rocky Mountains and Sierra Nevada and Cascades) to Coahuila, Chihuahua, and Sonora.

STATE RECORDS.—Throughout New Mexico, the Rocky Mountain Nuthatch is found in summer mainly from 7,000 to 8,000 feet. Few species are so strictly

confined as this to a definite belt of altitude. Several birds were seen at Cloudcroft, 9,000 feet, in late July, 1909 (Green), but they may have nested at a lower altitude. In the Capitan Mountains they were noted from June 13, 1899 (Bailey), to June 28 and July 9, 1903, most common at 8,000 feet, but following down to the lower limit of the yellow pines on the southwest slope of the mountains (Gaut). [At Lake Burford they were fairly common, May 23-June 19, 1918 (Wetmore). West of Tres Piedras, at 8,000 feet, young were found in an aspen nest, June 6, 1916 (Ligon). Several pairs nest in the Santa Fe Canyon up to 7,800 feet (Jensen).] They nest abundantly at Willis, 7,800 feet (Henshaw); but were not noted much higher in the Sangre de Cristo Mountains (Ligon). They were breeding in the cottonwoods at Glorieta, 7,500 feet, July 9, 1903 (Weller); and in the pines on Mesa Yegua, at 7,400 feet, June 25, 1903 (Bailey); at 7,000 feet in the pines at Fort Wingate, June 27, 1905 (Hollister); were common June 15, 1909, at 8,000 feet in the Zuni Mountains, and a few were noted up to 8,500 feet (Goldman); they breed in the Chuska Mountains (Gilman); in the Pinos Altos Mountains near Silver City, among the pines, oaks, and junipers, 7,000-8,000 feet, July 8, 1894 (Fisher); at 8,000 feet in Monument Pass, Sierra County, June 3, 1913 (Ligon); in the Organ Mountains (Merrill); the Animas Mountains (Goldman); and at Tres Piedras, 8,000 feet (Loring).

In the fall the species wanders sometimes below, but mainly somewhat above its breeding range [several observed in Albuquerque at about 5,000 feet in September (Ligon, 1916-18)]; one taken at Silver City, November 6, 1912 (Kellogg); to at least 9,000 feet in the Chuska Mountains, early in October, 1908 (Birdseye); and to 10,000 feet in the Mogollon Mountains, late October, 1908 (Goldman). [One was seen, July 18, 1919, on the very top of Pecos Baldy, 12,600 feet (Ligon).]

It remains through the winter not far from its summer home, as at Chama, 7,800 feet, December 21, 1893 (Loring); while at the same time it descends a little lower in the valleys to Albuquerque (Harman); and Fruitland, 5,000 feet (Birdseye); Gila, 4,500 feet (Goldman); Socorro, 4,500 feet (Abert); and Fort Fillmore, 3,800 feet (Henry).—W. W. COOKE.

NEST.—Usually in oaks or pines, but also in aspens; a natural cavity, with a long narrow opening, lined with hair and fur of various animals. *Eggs*: Usually 5, white, spotted with reddish brown.

FOOD.—Insects and spiders constitute about 50 per cent, mainly beetles, moths, and caterpillars, with ants and wasps—all in the bird's favor except a few ladybird beetles. More than half the vegetable food consists of mast—acorns and other nuts, or large seeds. The Nuthatch does no injury so far as known, and much good (Henshaw).

GENERAL HABITS.—A black-headed, white-cheeked, and short-tailed Rocky Mountain Nuthatch walking calmly down the side of a yellow pine trunk, calling *hack-ack-ack-ack-ack-ack-ack-ack*, is a pleasantly familiar figure to western field workers. While its general plumage is protectively inconspicuous, its strikingly white cheeks and white tail marks serve well as directive marks in the shadowy forest.

At Mesa Yegua, in June, and Glorieta and Bernal Mesa, in August, we found the birds in the yellow pines at the lower edge of Transition Zone at the base of the Rocky Mountains. We also found them at many different points in the yellow pine belt, notably in the Guadalupe Mountains, about the La Jara, Horse, and Burford Lakes, on the

Jicarilla Apache Reservation and in the Gallinas, Jemez, San Mateo, and Mogollon Mountains.

Ten miles from Santa Fe, a nest that Mr. Jensen found in a cavity in an oak, when cut into on May 27, 1920, contained small young. As he is a scientific egg collector, interested in bird life, he "closed the opening and watched the birds raise the family." A year later—on May 15, 1921—the nest when examined held a set of eight heavily incubated eggs, so again he left the nest undespoiled, and as he tells us, with evident satisfaction, "these also were hatched and raised" (1923b, p. 467).

At the head of the Mimbres in May, 1906, a Nuthatch came to Mr. Bailey's cabin to eat tallow out of a gunnysack hanging on the wall, but the stomachs of specimens examined contained mainly insects and nut meats. Like other nut eaters, the Nuthatches store away some of their food. When in their woods, M. P. Skinner says, "I heard a lively twittering overhead and looked up to see a Rocky Mountain Nuthatch with a pinyon nut in his bill looking for a place to cache it. Finally he thrust it into a crevice under the bark of a dead limb of a yellow pine and pushed it into place with a few strokes of his bill."

As Mr. Willard expresses it, these little birds "talk to each other as they hunt for food along the trunks or branches," and while the female is sitting her mate keeps up his talking as he hunts for food to take to her. He usually takes it into the nest to her, but she often comes to the entrance or even outside for it. In the nest linings which Mr. Willard has examined, skunk and squirrel fur, and cow and deer hair predominated, but he has also found rabbit fur and bear's hair—an interesting assortment (1912d, p. 213).

ADDITIONAL LITERATURE.—ALLEN, F. H., Educational Leaflet 59, Nat. Assoc. Audubon Soc.—MICHENER, H., Condor, XXVII, 38-39, 1925 (bird banding).—RICHARDS, G., Condor, X, 194-196, 1908.

RED-BREASTED NUTHATCH: *Sitta canadensis* Linnaeus

DESCRIPTION.—*Length:* 4.1-4.7 inches, wing 2.6-2.8, bill about .6. *Adult male:* Top of head glossy black with faint bluish gloss, white stripe over eye and black line through eye; upperparts bluish gray, tail with all but middle feathers black, tipped with gray, outer pairs marked with white; wings without black or white; cheeks, chin, and upper throat white, shading below from buff to tawny and ochraceous-buff (more deeply colored in fall and winter). *Adult female:* Similar but colors duller, black of head and hind-neck usually plumbeous. *Young:* Similar to same sex in adult, but duller.

RANGE.—Canadian Zone from Upper Yukon Valley, northern British Columbia, southern Mackenzie, northern Quebec, and Newfoundland south to Massachusetts and Minnesota, in Alleghenies to North Carolina, in Rocky Mountains to New Mexico and Arizona, and in the Sierra Nevada and other high mountains in California.

STATE RECORDS.—If the Red-breasted Nuthatch ever breeds in New Mexico it must be rarely and probably accidentally. A single specimen was taken June 13, 1899, at 6,600 feet near the base of Mount Capitan (Bailey). The bird could



FIG. 93. Red-breasted Nuthatch

hardly have been breeding at the place where it was collected and presumably was a non-breeding straggler. There is no other summer record for New Mexico, and the bird is rare as a breeder even in Colorado.

The first migrants appear in New Mexico late in August: Sierra Grande, about August 17, 1903 (Howell); Beaver Lake, 7,500 feet, August 26, 1908 (Bailey); one near Alps, September 4, 1903 (Howell); one at 8,700 feet near Taos Pass, September 11, 1903 (Bailey); a few on the summit of Costilla Pass, 10,500 feet late in September, 1903 (Howell); one September 24, 1902, near Fort Sumner, 4,200 feet, and one, October 1, 1903, near the Ruins of Gran Quivera, the only one seen in the Mesa Jumanes region although it was common in the Manzano Mountains, October 3–December 23, 1903 (Gaut). It has also been noted at Fort Webster (Henry).

Since the species is not known south of New Mexico, these fall birds undoubtedly remain in the State through the winter. In the Guadalupe Mountains a few were seen at about 6,500 feet, January, 1915 (Willett).

In spring migration, one was seen May 11, 1907, at Shiprock (Gilman).—W. W. COOKE.

NEST.—In holes in stubs or dead trees, lined with grass, roots, and shreds of bark. Eggs: 4 to 8, white or creamy, speckled with browns and lavender.

GENERAL HABITS.—While similar to the Rocky Mountain Nuthatch in habits, the notes of the Red-breasted are sharper. It is also said to be quicker in its motions and, as Mr. Silloway has noticed, at times acts like a flycatcher, leaving its investigation of bark crevices to fly out "capturing a flying insect dexterously in the air," and returning to its gleaning on the bole (1907, p. 54). The male is said to share the duties of incubation.

PYGMY NUTHATCH: *Sitta pygmaea pygmaea* Vigors

PLATE 54

DESCRIPTION.—*Length:* 3.8–4.5 inches, wing about 2.6, bill .6. *Adults:* Crown and hind-neck olive, hind-neck with a concealed buffy or whitish spot (exposed in worn plumage); rest of upperparts bluish or leaden gray, tail with middle feathers like back with basal half partly white, rest of feathers black, the outer pairs tipped with slate and banded with white; wings mainly unmarked, primaries and their coverts brownish slate, the longest ones usually edged with white; throat white, or buffy white, rest of underparts dull buffy (whitish in worn midsummer plumage); sides and flanks bluish gray. (From late summer to early winter, coloration deeper, white of nape obscured by olive tips to feathers.) *Young in juvenal plumage:* Similar to adults, but crown and hind-neck gray, almost like back, and sides and flanks buffy or brownish instead of gray.

RANGE.—Transition Zone from southern British Columbia and Montana south to Vera Cruz, Puebla, and Michoacan.

STATE RECORDS.—The Pygmy Nuthatch is abundant in the yellow pines of New Mexico. It was found on July 2, 1864, at Fort Wingate, 7,000 feet (Coues),



From Handbook of Birds of the Western United States

PYGMY NUTHATCHES

After the nesting season, jolly bands of the bluish gray Pygmies wander about, enlivening the yellow-pine forest with their cheery small talk

which seems to be about as low as it breeds in the State, while it rarely breeds below 7,500 feet on the lower edge of the yellow pine belt. At this latter altitude it is one of the abundant breeding birds over nearly all the State and continues common to 8,500 feet and occasionally to 9,000 feet, as at Cloudercroft, July 26, 1909 (Green). It was found to 9,800 feet on the Pecos River during August, 1903; ranging even to 10,000 feet, August 28, 1906, in the Jemez Mountains (Bailey);



MAP 43. PYGMY NUTHATCH

Triangles mark breeding and probable breeding localities

and to the same altitude, August 11, near Kingston (Metcalf). [It is common in northern Santa Fe County from 7,500 to 10,000 feet. Fresh eggs are found June 1-15 (Jensen).]

The species [apparently] is nearly non-migratory, but descends slightly in winter and was seen at Fruitland, 5,000 feet, among the cottonwoods, October 15-November 1, 1908, where it was decidedly out of place (Birdseye); in the Guadalupe Mountains above 5,000 feet it was common in January, 1915 (Willet); and it has even been known to appear at Fort Fillmore, 4,000 feet (Henry).—W. W. COOKE.

NEST.—In crevices of bark or holes in pines or other trees, 20 to 40 or more feet from the ground; lined with feathers, down, wool, and hair. *Eggs*: 6 to 7, white, covered with red spots, most thickly about the larger end.

FOOD.—About 17 per cent seeds, mainly seeds of conifers, and 83 per cent of insects, including wasps, spittle-insects, weevils, caterpillars, and a few spiders. Nuthatches are eminently useful birds. They do not prey upon cultivated crops, eat but few useful insects, and probably are among our most efficient conservators of the forest and orchard (Beal).

GENERAL HABITS.—The plump, short-tailed Pygmy Nuthatches with small gratefully cheery notes proceed from pine to pine, with a droll bob-tailed flight, and when working about the tips of the pine branches the light patch on the back of the neck shows, marking them off still more plainly from the Rocky Mountain Nuthatches.

The Pygmies are characteristic birds of the Transition Zone yellow pine belt, following it on steep hot slopes to the extreme upper limit of the zone, sometimes as high as 10,000 feet. They were seen on Pecos Baldy at both the upper and lower edges of the zone, from 8,000 to 9,800 feet on cold slopes. On the east slope of the Taos Mountains they were common at all our yellow pine camps from Solitario Peak to the Taos Mountains.

They were common all through the yellow pines at the head of the Mimbres late in May, 1906, where a pair was seen feeding young in a hole 20 feet from the ground in a dead pine. In Santa Clara Canyon we found them among the most abundant birds, and as late as August 23, an apparently well feathered young one was seen putting its head out of the nest hole, in a dead cottonwood 30 to 40 feet from the ground. There was a series of holes up the trunk, small, and, like the one in use, rather irregular. In the Santa Fe country, Mr. Jensen has found eight nests in pine stumps, excavated by themselves. The birds seen by us in the yellow pines, August 21–26, seemed to be going about in families.

From the mountains northeast of Silver City, April 18, 1919, Mr. Ligon wrote, "I watched two of these little fellows laboring at a nest hole eighteen feet up in a dead pine. One was inside, making the noise of a woodpecker. I watched the performance for about ten minutes, during which time it made three trips out to the entrance to fling the chips and dust to the wind with a quick shake of the bill. It came out apparently to rest and the other went quickly in, and after it had hammered a little, came up with its cuttings, flinging them away and quickly returning. On the 18th and 19th, it seemed that all the Pygmies, as if by general order, were working in nest holes." On the 20th, a nest was examined and found lined with feathers and other soft materials, but so far without eggs (MS).

A pair that were watched by Mr. Gignoux, feeding young twenty

feet from an occupied cottage, foraged from fifty to eighty feet from the ground in about twenty large pine trees, feeding from half a minute to eight minutes, and making, as was estimated, three hundred trips a day, in distance about thirty miles (1924, pp. 31-32).

Pygmies were abundant on the northerly slopes of the Animas Mountains in early August, 1908, Major Goldman says, from 6,800 feet to the summit, "usually seen in small flocks, busily and noisily searching for food among the leaves and small twigs of oaks or pines. Sometimes parts of the same flock would occupy two or three trees at once, the birds keeping near together as the flock moved along" (MS).

In the Gallinas Mountains, before the cold snap of October 9, 1904, the voice of the Pygmy had been one of the commonest we heard among the yellow pines, but after that it was not noticed until in going down out of the mountains on October 11 we found it in the nut pine and juniper belt, at a pleasanter temperature.

Eminently social, as fall approaches, Mr. Henshaw says, small bands of Pygmies, titmice, and warblers, all on the best of terms with one another, gather together until "their number often reaches the hundreds, and the trees seem fairly alive with the merry party, while the loud querulous *weet-weet* of the Nuthatches, which is constantly repeated as they move along the branches or fly from tree to tree, is always conspicuous among the softer notes of the warblers and other species. At this season they descended from the pine region, and are often seen in the groves of evergreen oaks" (1875, p. 176).

Among the conifers at Chama, during late December, 1893, Mr. Loring found the Nuthatch flocks feeding both in the trees and on the ground.

CREEPERS: Family Certhiidae

Subfamily Certhiinae

The Creepers spend most of their time creeping up tree trunks picking insects out of the bark—never hanging head down as do the Nuthatches—and in addition to the disguise of their white-streaked, brown plumage are remarkably adapted to the life. Their bills are long, slender, sharp, and decurved for reaching the insects in the bark, and their claws are sharp and much curved for clinging to it, while their long, elastic tails have rigid, pointed tips like those of a woodpecker for bracing against the trunk of the tree.

MEXICAN CREEPER: *Cérthia familiáris albescens* Berlepsch

DESCRIPTION.—*Length*: (Skin) about 4.6-5.1 inches, wing 2.4-2.5, tail 2.2-2.5, bill .5-.6, tarsus .5-.6. Female about the same. *Adults*: *Upperparts* blackish, head and back conspicuously streaked with white, *rump* chestnut, primary coverts not tipped with white; underparts brownish gray.

RANGE.—Lower Canadian and Transition Zones from southeastern Arizona and extreme southwestern New Mexico south to Tepic and Zacatecas.

STATE RECORDS.—The only record for the Mexican Creeper in New Mexico is that of a specimen taken July 13, 1892, on the west side of the San Luis Mountains (Mearns). This is a Mexican subspecies, coming north regularly to southern Arizona and undoubtedly occurring not rarely in the mountains of extreme southwestern New Mexico.—W. W. COOKE.



From Biological Survey

FIG. 94. Brown Creeper (*Certhia familiaris americana*)

On its way up a tree trunk

GENERAL HABITS.—In Arizona, Mr. Swarth found the Mexican Creeper a fairly common summer resident in the higher pine regions, seldom descending below 7,000 feet. When the young came out, a downward movement began, and late in the summer they were found in the oak belt (1904, p. 60).

**ROCKY MOUNTAIN
CREEPER: *Certhia familiaris
montana* Ridgway**

DESCRIPTION.—Adult male (skin) length 4.7–5.3 inches, wing 2.5–2.6, tail 2.5–2.7, bill .6–.7, tarsus .6–.7. Female slightly smaller. Adults: Upperparts dusky, head and back streaked conspicuously with white, rump tawny, primary coverts tipped with whitish; underparts white.

RANGE.—Breeds in Boreal Zones from central Alaska, central British Columbia, and central Alberta south in Rocky Mountains to New Mexico and Arizona; winters to southeastern California and probably Mexico.

STATE RECORDS.—The Rocky Mountain Creeper is undoubtedly more common in summer in New Mexico than the few records of its occurrence would indicate. One was taken June 19, 1909, at 9,000 feet on Bear Ridge in the Zuni Mountains (Goldman); one seen early in June, 1900, at Cloudercroft (Bailey); and several there, July 23–August 1, 1909 (Green); while young birds were seen in July, 1907, near the top of the Chuska Mountains, about 9,000 feet (Gilman). [Young were found June 24, 1916, out of the nest north of Mount Taylor, at 7,500 feet. At 7,500 feet in Black Canyon, 32 miles southwest of Chloride, on June 28, 1920, adults were found feeding young in the nest (Ligon).] These, of course, represent breeding

birds and the young of the year taken August 14, 1903, at 11,600 feet and the next day at 12,000 feet on Pecos Baldy (Bailey), were undoubtedly hatched in the Pecos Mountains, but possibly at an altitude many hundred feet lower; while the birds seen August 16, 1903, at 9,500 feet in the Capitan Mountains (Gaut), were probably also summer residents.



MAP 44. BROWN CREEPERS

1. Rocky Mountain Creeper. 2. Mexican Creeper

Shaded areas show general range. Triangles mark breeding and probable breeding records

In the fall migration, the species spreads into central New Mexico, where it was seen once in the Manzano Mountains at 8,100 feet (Gaut); was fairly common in the Gila Forest Reserve (Ligon); in the upper Jemez Mountains, August 25-September 3, 1906; in the Mogollon Mountains among the spruces from Willow Creek, 8,500 feet to the top of the divide, 9,400 feet, October 16-31, 1906; and the next week in the live oak and mesquite at Glenwood, 5,000 feet (Bailey); early in November, 1909, at 9,000 feet near Kingston (Goldman); and one near there on Sawyer's Peak as early as August 2, 1904 (Metcalf).

It remains in the State through the winter, and was noted in December, 1882, at Las Vegas (Batchelder); December 19-29, 1893, at Chama (Loring); and December 17, 1902, on Salinas Peak in the San Andres Mountains (Gaut). According to Doctor Henry it used to winter at Fort Fillmore and Fort Thorn on the Rio Grande, and two specimens were taken March 3, 1903, in the same district at Mesilla Park (Ford).

[It is a common spring visitor to the Santa Fe Indian School campus (Jensen, 1922).]—W. W. COOKE.

NEST.—Behind loosened bark or in similar cavities, about stumps or dead trees; made of felted materials and feathers. *Eggs*: Usually 5, white, spotted with reddish brown.

FOOD.—Minute insects and insects' eggs, also cocoons of tineid moths, small wasps, ants, and bugs, especially scales and plant lice, with some small caterpillars. As it remains in the United States throughout the year, it naturally secures hibernating insects and insects' eggs, as well as spiders and spiders' eggs, which are missed by the summer birds. On its bill of fare we find no product of husbandry nor any useful insects. Its tiny eyes are sharp enough to detect insects so small that most other species pass them by, and altogether the Creeper fills a unique place in the ranks of our insect destroyers (Henshaw).

GENERAL HABITS.—Adapted in bill, body, tail, and feet to climbing up but not down a tree trunk, a Creeper, on reaching the top of his trunk flies obliquely down to the foot of another tree and starts up again. Hearing the two characteristic, fine-drawn notes in the woods of the Wheeler Peak Amphitheater, we stopped to look for one and soon discovered a little streaked brown form rocking up a spruce trunk. Others were heard near by, giving not only the call notes but a fine low song.

Lower down at 8,400 feet, in a yellow pine grove on Red River, the molt of a specimen taken August 16, 1904, was already completed, with the exception of a few pinfeathers on the head and back. In the Mogollon Mountains where a number of the Creepers were seen late in October, at our camp below the famous Socorro grade, they came into the trees with the first sun, mornings, in company with Ruby Kinglets, Mountain Chickadees, and Pygmy Nuthatches. They were often seen creeping along the underside of small spruce branches.

A nest that Mr. Ligon found in the Black Range was thirty-five feet from the ground under the shell of a dead yellow pine. It had three entrances and when the parents had gone in with food at one, they would go out at another on the opposite side, and scale around the tree before flying away. On the return they would use the same caution, light low down and creep up to the nest.

Easily overlooked in the dark coniferous forest, the little Brown Creeper is well worth patiently hunting for, when his remote notes, thin and high drawn, catch the ear as you pass along a mountain trail.

ADDITIONAL LITERATURE.—BAILEY, F. M., *Bird-Lore*, XVIII, 229-233, 1916.—BRADBURY, W. C., *Condor*, XXI, 49-52, 1919 (nest).—TYLER, W. M., *Auk*, XXXI, 50-62, 1914.

DIPPERS: Family Cinclidae

The semi-aquatic Dippers, getting their food largely under water, have compact, dense, water-proof plumage underlaid with oily down, nostrils protected by a large scale, and tail short, almost hidden by its coverts; being non-migratory and making only short flights, like the Quail and Grouse they have short, stiff, rounded wings, concave beneath; and as they habitually walk about on wet slippery rocks, the middle toe has its basal half united to the outer toe, a little less to the inner toe, the claws are strongly curved, the claw of the middle toe with its inner edge more or less produced, sometimes slightly nicked or pectinate.

AMERICAN DIPPER; WATER-OUZEL: *Cinclus mexicanus unicolor* Bonaparte

PLATES 55 AND 56

DESCRIPTION.—*Length*: 7-8.5 inches, wing 3.4-3.8, tail 1.9-2.1, bill .6-.7, tarsus 1-1.2. *Adults in summer*: Slate-gray, paler below, head and neck faintly tinged with brown, tail feathers and primaries dark brown. *Adults in winter*: Underparts and tips of inner primaries margined with whitish, eyelids narrowly marked with white (Ridgway). *Young*: Similar to winter adults but crown gray, throat mainly whitish, rest of underparts more or less buffy.

RANGE.—Hudsonian, Canadian, and Transition Zones in mountains of western North America from near tree limit in northwestern Alaska, British Columbia, and west-central Alberta south to southern New Mexico, Arizona (rarely), and northern Lower California.

STATE RECORDS.—[The American Dipper, or Water-Ouzel, is common and widely distributed throughout the mountainous regions of northern New Mexico, but also breeds along suitable watercourses at altitudes ranging from 9,200 down to 7,000 feet, and as far south as Reserve (Ligon, 1919). A nest with five fresh eggs was found, April 25, 1916, near the head of the Nigreto, 23 miles southeast of Reserve, at 7,400 feet. It nests commonly on the headwaters of the Pecos and other streams heading in the Pecos Mountains, and also on the Upper Rio Grande. Young were found out of the nest near the junction of the Hondo and Rio Grande June 3, 1916 (Ligon)]. Eggs were found, May 3-16, 1898, in the Sangre de Cristo Mountains above Las Vegas (Mitchell). In July, 1904, it was found in Wheeler Peak amphitheater at 11,400 feet. In the Pecos region, on the Rio Media, during July and August, 1903, it was seen as high as 10,000 feet (Bailey). [It was observed on the head of Red River, June 19 and 20, at 10,000-11,000 feet, and in Uraca canyon southwest of Cimarron, June 16, 1924, at about 8,500 feet (Ligon).] During the summer it is found at 8,000 feet at Halls Peak (Barber); and down to 7,200 feet on the Pecos River below El Macho (Bailey). The most southeastern record in the State is that of one taken August 20, 1898, at Ruidoso (Barber).

If it performs any migration in New Mexico, it is merely a moving up the mountains in summer and descending toward the foothills in winter, but even this movement must be comparatively slight, for the summer and winter limits are not greatly different except in the higher mountains of the Sangre de Cristo Range.

In the fall it was seen on September 25, 1903, as high as 11,600 feet on a glacial lake above Hondo Canyon; and at about 9,500 feet, on a lake at Twining, October 16, 1903; though not seen after that date. One was still present October 27, 1906, at 8,500 feet on Mogollon Creek (Bailey); and one seen, October 20, 1906, on Silver Creek (Stafford).

In winter, one was taken January 23, 1904, at 8,000 feet near Arroyo Seco (Surber); one noted December 21, 1893, at 7,800 feet, at Chama, when only a few places of swift water in the river were left unfrozen (Loring); and it was common at Las Vegas, 6,400 feet, December 4-23, 1882 (Batchelder). In winter it was found abundant on the Mimbres and descends at least to 6,300 feet at Fort Webster, where it was noted from October 10 to April 1 (Henry); and a few descend to 5,800 feet at Rinconada (Surber); [about 5,800 feet at Silver City (Kellogg).]—W. W. COOKE.

NEST.—Usually on ledges of rock over water, often behind a cascade, but also on rocks in midstream and on beams of bridges; a bulky, oven-shaped structure arched over, with opening on the side or with a bottle-shaped entrance, cemented to the rock; made of green moss, weed stems, pine needles, and leaves lined with mud; with an inner nest of twigs and non-absorbent wiry grass. *Eggs*: 3 to 5, white.

FOOD.—Largely water beetles, caddice-fly larvae, black-fly larvae, dragon flies, and other aquatic insects.

GENERAL HABITS.—The gray wren-like American Dipper, or Water-Ouzel, which is delightfully associated with snowy waterfalls and clear, white-cascaded mountain streams, is appropriately absent from those made turbid by mining operations. When we were going up the Pecos River we discovered it first standing calmly on a rock surrounded by white-churned water at 7,200 feet, and as we ascended the swift-flowing stream we met it at various places from 8,000 to 8,700 feet, at which point we left the river. In the Wheeler Peak amphitheater at 11,400 feet, we were much pleased to find the Ouzels in the white-cascaded brooks both above and below the quiet lake. One was also met with later on Coyote Creek, and another, on September 22, 1904, on Lucero Creek at 7,700 feet. The year previous one was found by Mr. Bailey, on September 25, in the cold water of a glacial lake above Hondo canyon at 11,600 feet. When discovered, it was ducking and diving away out where the water was deep; then it swam ashore and climbed up on a stone, tipping and singing gaily its bright vivacious song as if September were May.

In the southern part of the State, in the Mogollon Mountains, a Dipper who lived on Mogollon Creek was seen by us a number of times at about 8,700 feet in the neighborhood of some cascades in the coldest part of the gulch. When first seen, October 22, 1906, he sat on a stone puffed up as if justifiably chilled, the stones around him being snowy and icy, and the ice on a pool near him being thick enough to bear a man. But, on October 27, to my surprise I saw the little fellow I had been pitying, calmly wade out in the ice-cold water, walk up through some rapids, and stand on a cake of ice, quite as a matter of course. In Alaska and Wyoming, Doctor Cordier tells us, the Ouzels live in a temperature of fifty degrees below zero, their heavy waterproof covering, like a thermos bottle, keeping the cold out and the heat in (1927, p. 173).



Photograph by Mrs. C. F. Bicknell

WATER-OUZEL

A protectively slate gray little bird near its nest on a ledge close behind a roaring, forty-foot waterfall

In Alaska, Alfred M. Bailey has also found the Ouzels in winter, near salt water, where the tides keep the streams open. In the spring time, he tells us "the joyous voiced males can be heard a great distance, as their beautiful songs blend with the rhythmic note of rushing waters" (1927, p. 364).

In New Mexico in cold October, when Mr. Surber wrote, "I have enjoyed watching a Water Ouzel from my cabin window"; he added: "It would dive under the water and stay there from three to five minutes at a time, and between dives come to the top and swim around" (MS).

Before diving the Ouzels sometimes locate their food, Mr. Burcham states, dipping the head at intervals beneath the surface (1904, p. 50). The larva of a small black fly that attaches itself to submerged stones and sticks is apparently a favorite food, and after locating one from a rock in midstream the Ouzel dives above it and, letting the current carry him back past the stone, tears off the larva as he goes by. In diving, as the Bryants say, the Ouzel starts head first for the bottom, but when he comes up his oily feathers seem to shed the water like magic. In swimming he paddles alternately, his unwebbed feet seeming to furnish plenty of power to move his buoyant body (1915, p. 99).

Although habitually feeding on insects attached to submerged stones, one of the Ouzels has been seen by Enid Michael hunting over snow slopes about a lake where rosy finches were foraging, running to and fro, "pausing here and there to pick up frozen insects" (1926a, p. 45).

When a pair of Colorado Ouzels were feeding their young in the nest they were watched and photographed, as never before, by Doctor Cordier. In the icy water he built a platform six feet from the nest. "From this continually sprayed perch," he tells us graphically, "clothed in waterproof garments, the camera protected by a rubber cloth, I stood for many hours making 'stills' and 'close-up' moving pictures and observing the birds." The mother fed the young about eight times an hour. When she was on the nest and her mate came with food, the young reached out from under her breast to take it. In hunting for food, the old birds would "scale the water-splashed, glazed surface of the almost vertical cliff" within a few inches of the massed waters of the fall, gathering food as they went. This was made possible by the character of their feet constructed like ice creepers, with long claws and strong flexor muscles.

In his moving pictures, Doctor Cordier showed the much-discussed movement of the nictating membrane, a "glistening, pearly white, translucent, moist fold of the conjunctiva," which is "called into action to clear the cornea of the watery mist while the bird is near the spray and splashes of falls and rapids." The pictures show the movement to be "from above downward, *nearly the horizontal width of the upper*

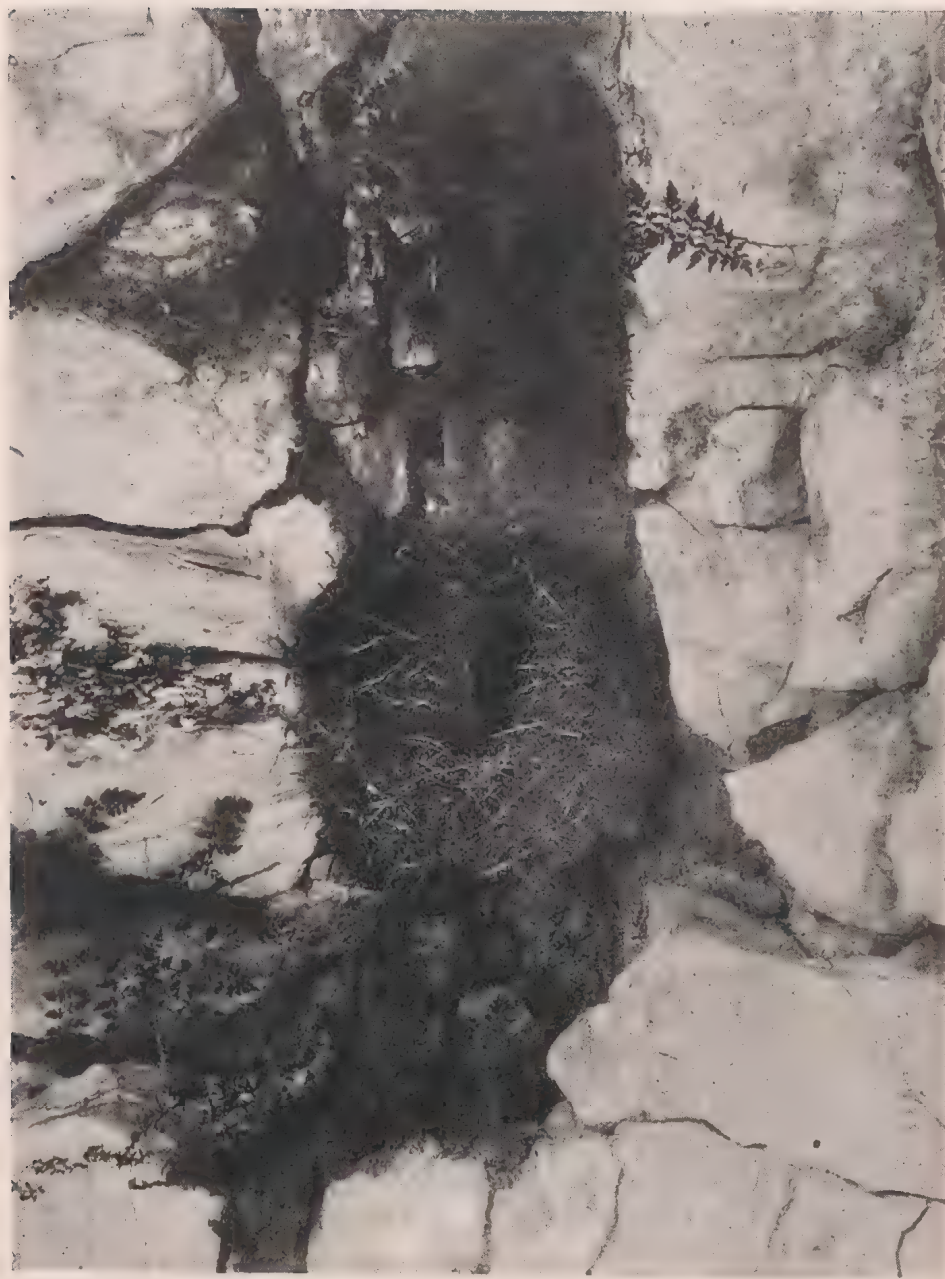
eyelid." The quick working or flashing of this white membrane, so conspicuous in the dark, is unconscious reflex action.

Doctor Cordier makes another interesting observation. When in the water, he says, the Ouzel's under cape of oily down may often be seen "protruding through or between the heavier coat of feathers, producing a shimmering halo about some parts of the bird's body" (1927, p. 178).

Unique and interesting in all its ways of life, and with a delightful gift of song, this cheery little comrade is eagerly looked for and long remembered, associated as it is with the most vital waters of the noble mountains of northern New Mexico.

At the mouth of the Hondo, in June, 1916, Mr. Ligon found several Ouzel nests in characteristic places. Here, as he says, the Hondo pitches and foams between and over great boulders between perpendicular walls. A hundred yards from where the stream enters the Rio Grande, the toll road is carried over by a short wooden bridge on which vehicles are constantly passing. On the sleepers of this bridge were two Dipper nests. A short distance above, on a large boulder that rose slightly above the water of the wild, dashing stream, was a nest on the bare rock, sun-exposed and constantly showered over by the spray. Only a short distance above was a third, on a ledge of the canyon wall, above the water.

Another nest was found by Mr. Ligon on the Santa Barbara River on June 27, 1919, when, owing to summer rains and melting snow on the higher peaks of the Sangre de Cristos which it drains, it was forty feet wide, raging, and dangerous to ford even with strong horses, having a tremendous current on account of its rapid fall. Engaged in the work of destroying predatory animals—at the moment, grizzly bears—Mr. Ligon and Hunter McMullin were traveling with a pack outfit and seven dogs, some of which were young and unaccustomed to swimming swollen streams. At an unusually bad crossing, they had to cut down a spruce tree to span the stream to enable the dogs to cross in safety. While cutting the tree, Mr. Ligon saw a Dipper flying back and forth and discovered a nest on a boulder that lay in mid-stream just above the main part of the dashing torrent, the spray from which constantly showered the nest. As he wrote: "The parent bird was very much concerned over our presence, alighting on the boulders not over twenty feet away. After we had crossed the stream, by the use of a long pole thrown across the intervening space, I crawled to the boulder and examined the nest, which contained five young, smoothly feathered and about the size of the adult bird. After I had disturbed them, they all piled out into the raging, icy torrent, for a little way flopping their wings and riding over the dips and white caps, finally disappearing below, where the current was thrown into a



Photograph by H. W. Nash

WATER-OUZEL'S NEST

A big mossy ball safe in a niche of rock, between beautiful ferns, its two hungry nestlings waiting close to its dark doorway

confusing mass of billows against some trees and drifts that had collected on them. I felt quite sure that they had all been hammered to pieces in the drifts, or drowned. However, regaining the bank, I went down stream some distance to see if I could get any trace of them. One was quietly perched on a snag just above the foam on a drift. Below this point I saw three others on stones and on the bank, flirting their tails and dipping their bills, imitating the action of the adult birds, all very willing to hop into the stream, which was leaping and tumbling at every point. I soon saw that they were at home, and amply able to care for themselves, although a few seconds before they had had their introduction to water." As he concludes, one can but admire and respect these brave little birds of the wild mountain streams. "The wilder it is, the more they seem to enjoy themselves" (MS).

ADDITIONAL LITERATURE.—HENDERSON, JUNIUS, *Bird-Lore*, X, 1-7, 1908.—KEYSER, L., *Birds of the Rockies*, 162-174, 1902.—MILLER, O. T., *A Bird Lover in the West*, 76-85, 1894.—MUIR, JOHN, *Our National Parks*, 238-240, 1901; *The Mountains of California*, 276-299, 1894.—SKINNER, M. P., *Condor*, XXIV, 18-21, 1922 (in *Yellowstone*).—WILLARD, J. M., *Bull. Cooper Ornith. Club* (= *Condor*, vol. 1), 23-24, 1899.

WRENS: Family Troglodytidae

The Wrens are small brown birds mainly six inches or less long (Cactus Wren eight inches). They live largely in undergrowth, both sexes being protected by the same inconspicuous plumage. Unlike the family of Titmice, Chickadees, etc., in the Wrens the bill is unnotched, the nostrils are exposed, overhung by a scale. The wings are short, more or less rounded, of ten primaries, the tail, unlike that in the family of Creepers, never rigid nor acuminate, more or less rounded, often held over the back. "They are active, nervous little creatures . . . Their notes of alarm or displeasure are loud, harsh and insistent, but the songs of most species are marked by sweetness and brilliancy of execution. Their irrepressible energy finds expression in nests of great size or complex structure as well as in exceptionally large sets of eggs" (Chapman).

WESTERN HOUSE WREN: *Troglodytes aëdon párkmani* Audubon

DESCRIPTION.—*Length*: 4.2-5.2 inches, wing 2-2.2, tail 1.8-2.1, bill .4-.5, tarsus .6-.7. *Adults*: Upperparts dull brown, barred with blackish except on head, strongest on wings and tail; rump with concealed white spots; underparts dingy, sides and flanks lightly barred. *Young in juvenal plumage*: Breast mottled with blackish.

RANGE.—Breeds in Lower Canadian, Transition, and Upper Sonoran Zones from southern British Columbia, northern Alberta, central Saskatchewan, and southern Manitoba south to southern Illinois, southern Missouri, southwestern Texas, Arizona, and San Pedro Martir Mountains, Lower California.

STATE RECORDS.—The breeding range of the Western House Wren includes the whole of the mountains of New Mexico up to about 9,000 feet. It was common in the Zuni Mountains June 15, 1909, as high as shelter could be found at 8,500-9,000 feet (Goldman), and breeds commonly at Clouderoft, 9,000 feet (Green).

The species breeds more commonly at 8,000 feet, as at Glorieta where young were being fed July 7-10, 1903 (Bailey); Willis, 7,800 feet (Henshaw); Tres Piedras, 8,000 feet, July 11-19, 1892 (Loring); Pueblo Creek near Taos, about 8,000 feet, feeding young the second week in July, 1904 (Bailey); Chuska Mountains July,



From Biological Survey

FIG. 95. House Wren (*Troglodytes aedon aedon*)

Hurrying home to a hungry family

1907 (Gilman); and Pinos Altos Mountains, near Silver City, 7,000-8,000 feet, June 27-July 12, 1894 (Fisher). [In Santa Fe, 7,000 feet, it nests in bird boxes; in Santa Fe Canyon, a nest was found June 22, 1922. Fresh eggs are found June 10-July 1 (Jensen); at Lake Burford, 6,249 feet, it was fairly common and nesting, May 23-June 19, 1918 (Wetmore).] Thus it breeds for the most part between 7,500 and 9,000 feet. One was seen the last week in May, 1903, in Mott Canyon near Santa Rosa, at 4,600 feet (Bailey), but it may have been merely a late migrant.

As soon as the young are out of the nest, both old and young ascend far into the mountains and through the late summer and early fall are found as high as 10,000-11,000 feet. The species was common at 10,000 feet in the Capitan Mountains, August 12-16, 1903 (Gaut); at 9,000 feet in Costilla Pass, September 22-27, 1903 (Howell); up to 10,700 feet in the Red River Valley, August 14-19, 1904; at Lake Fork above Twinning, about 10,500 feet, August 6, 1904; and at 11,600 feet on Pecos Baldy, August 9, 1903 (Bailey).

In the fall migration it leaves the State principally in September, though a few remain to October. It was found as late as September 22, 1904, at Horse Lake (Bailey); October 1-7, 1908, at 8,800 feet in the Chuska Mountains (Birdseye); one October 20, 1906, on Willow Creek, about 8,500 feet, in the Mogollon Mountains (Bailey); and one the first week of November near Kingston (Goldman). In migration it has been noted at Apache, about 5,000 feet (Anthony); at 6,500-7,800 feet in the Burro Mountains, September 15-23, 1908; in the Magdalena Mountains 6,500-9,000 feet, August 28-September 4, 1909 (Goldman); in the fall at Fort Fillmore, 3,800 feet (Henry), and at Carlsbad, 3,100 feet, September 1-14, 1901 (Bailey).

In the spring migration, the first was noted as returning on April 18, 1889, at Cooney (Barrell); on April 24, 1904, one was collected at Rinconada (Surber); on April 6, 1900, one was taken at Albuquerque, and another May 28, 1900, at Willis (Birtwell).—W. W. COOKE.

NEST.—In woodpecker holes, other cavities in trees, or about buildings, made largely of twigs, lined with feathers. Eggs: 4 to 7, pinkish white, thickly spotted with reddish brown or brownish purple.

FOOD.—Grasshoppers, beetles, caterpillars, bugs, and spiders are the principal insects eaten; while cutworms, weevils, ticks, and plant lice are among the most injurious forms destroyed. The nestlings consume great quantities of insects, including locusts in Nebraska.

GENERAL HABITS.—The Western House Wren which, in plumage lacks the strong diagnostic ear marks of the other wrens of New Mexico, in habits is one of the most wrennish of them all, scolding vociferously at an intruder one moment, bubbling over with song by the nest the next.

At Glorieta we found two nests of the jolly, excitable little birds in holes in the big cottonwoods on the edge of camp, and they fluttered their wings and sang with their characteristic abandon. At the head of the Rio Mimbres, they were common about Mr. Bailey's cabin, as all along the valley, among old logs and rocks and brush piles.

On the Upper Pecos, the Forest Range Rider showed us a nest of nearly grown young under the peak of a log cabin, which his children had rescued from a snake. When we reached 11,600 feet, at the foot of Pecos Baldy, on August 9, the Wrens were still singing; but by the middle of September, on the east slope of the Taos Mountains, though common along a woodside brook and in the alders of the adjoining meadow, the only note heard from them was a low thin chattering scold, very different from the effervescent song of spring. The House Wren is one of the birds most ready to build in bird boxes, and his happy, persistent songs and vivacious ways make him a welcome addition to any one's premises.

ADDITIONAL LITERATURE.—BALDWIN, S. P., and W. W. BOWEN, Auk, 45, 186-199, 1928.—KALMBACH, E. R., and W. L. MCATEE, U. S. Dept. Agr. Farmers' Bull. 1456, pp. 10-11, 1926 (bird houses).—MERRIAM, F. A., A-Birding on a Bronco, 20-37, 1896.—MILLER, O. T., A Bird-Lover in the West, 24-28, 1894.—TRAFTON, G. H., Methods of Attracting Birds, 14, 15, 45-47, 1910.—WRIGHT, M. O., Educational Leaflet 39, Nat. Assoc. Audubon Soc.

WESTERN WINTER WREN: *Nánnus hiemális pacíficus* (Baird)

DESCRIPTION.—*Length: 3.6-4.2 inches, wing 1.8-1.9, tail 1.2-1.3, bill .4, tarsus .6-.7. Tail less than three-fourths as long as wing. Adults: Upperparts dark brown, brighter on rump and upper tail coverts; wings, tail, and often back and rump narrowly barred with blackish; line over eye, throat and breast tawny; belly and under tail coverts barred; flanks darker. Young: Breast mottled or margined with dusky, flanks barred.*

RANGE.—Breeds from Prince William Sound, Alaska, western Alberta, and north-western Montana south to northern Colorado and south-central California (especially in humid coast belt); winters in British Columbia and south to southern California and southern New Mexico. (Recorded from Arizona in spring.)

STATE RECORDS.—Early in September, 1902, Hollister was in the Sacramento Mountains and saw the Western Winter Wren on the Mescalero Indian Reservation at 8,500 feet. Barrell reports seeing one at Cooney, December 26, 1889. These are the only reported records for New Mexico.—W. W. COOKE.

NEST.—In coniferous forest, in crevices of dead logs or stumps, in bunches of green moss, or in upturned roots of trees; made of green moss, twigs, bark, and leaves; lined with feathers and sometimes rabbit hair and fur. *Eggs: 4 to 8, white or creamy, finely but sparingly spotted with reddish brown.*

GENERAL HABITS.—The diminutive, dark-coated Western Winter Wren would often be quite overlooked in the dark coniferous forest, where he makes his home, were it not for his unmistakable *ta-tib*, and his musical tinkling song. When once caught sight of, his abbreviated wisp of tail cocked over his back identifies him.

Like the Cactus Wren, he has been found by Mr. Bowles making a number of dummy nests, in this case built entirely of moss, which give him a dry retreat in the humid regions where he mainly lives.

In his densely shaded home in California, when his song made Mr. Rowley stop to investigate, a slight movement of a dark object supposed to be a mouse proved a female wren. At this discovery, the wise observer must have "frozen," for, as he tells us, "she was soon joined by the male, which began fluttering his wings and strutting about her, all the while keeping up a continual song" (1928, p. 161)—a pretty picture to carry away from the dark depths of the forest.

ADDITIONAL LITERATURE.—BOWLES, J. H., Cooper Ornith. Club (= Condor, vol. 1.), 72, 1899.—MILLER, O. T., Upon the Tree-Tops, 72-87, 1897.

[CAROLINA WREN: *Thryothorus ludovicianus ludovicianus* (Latham)

DESCRIPTION.—*Length:* 5.2-6 inches, wing 2.3-2.5, tail 1.8-2.3, bill .6-.7, tarsus .7-.8. *Adults:* Upperparts rusty brown; wings and tail barred with dusky, wing quills and lateral tail feathers with whitish spots; conspicuous stripe over eye whitish, underparts rusty whitish, clearest anteriorly; feet flesh-colored.

RANGE.—Breeds in Austral Zones in eastern United States and west to about 101° in Texas and southeastern Montana (rare); resident nearly throughout its range; winters in the Rio Grande Valley at the mouth of the Pecos.

STATE RECORDS.—A specimen of the Carolina Wren was sent to the Smithsonian Institution by Doctor Henry, and was later labeled as having been taken near Fort Thorn.¹ There is undoubtedly some mistake about its origin. The species is [apparently] non-migratory and does not range nearer New Mexico than the southern part of the valley of the Rio Grande in Texas. Doctor Henry himself, in his latest list of the birds he had secured in New Mexico, which was published some time after his specimen had been received and identified at Washington, did not mention the species as ever seen by him in the State.—W. W. COOKE.]

BAIRD BEWICK WREN: *Thryomanes bewicki eremophilus* Oberholser

DESCRIPTION.—*Wing:* 2.2 inches, tail 2.2. *Adults:* Upperparts pale grayish brown, tinged with rufous on rump; middle tail feathers brown, barred with black, rest of feathers mainly black, the three outer pairs with grayish white tips; line over eye, white; underparts whitish, purer on throat; under tail coverts heavily barred with black. *Young in juvenal plumage:* Breast spotted with blackish.

RANGE.—Sonoran Zones of Great Basin and Mexico from southeastern California and southern Wyoming south over tablelands to Zacatecas.

STATE RECORDS.—The type specimen of the Baird Wren was obtained by Doctor Mearns in the Big Hatchet Mountains in 1892. It breeds irregularly in the lower parts of the mountains of New Mexico, but seems to be absent from many parts of the

¹ In the Catalogue this specimen is marked as having been returned to Doctor Henry in 1859.

State where the conditions are apparently favorable. It has been noted during the summertime in the Big Hatchet Mountains, May 19-21, 1892 (Mearns); and at 5,000-5,500 feet, July 19, 1908 (Goldman); San Luis Mountains, July 12, 1892 (Mearns); Animas Mountains, 5,500-6,500 feet, July 30, 1908 (Goldman); Pinos Altos Mountains near Silver City, July 8, 1894 (Fisher); head of Mimbres, 6,500 feet,



MAP 45. BAIRD BEWICK WREN
Triangles mark breeding and probable breeding records

May 23, 1906 (Bailey); Chuska Mountains, July, 1907 (Gilman); abundant, feeding young, in the Guadalupe Mountains, August 1-10, 1901; Santa Rosa, 4,600 feet, late in May, 1903; and young out of the nest at Tucumcari, 4,100 feet, June 15, 1903 (Bailey). The species has been seen at Kingston, August 6, 1904 (Metcalf); in the Florida Mountains, 5,200 feet, September 6-8, 1908 (Goldman); and probably breeds at both these places.

During the fall and winter it descends into the river valleys and was noted at Redrock, September 27, 1908; Gila, October 11, 1908; and Las Palomas, 4,200 feet, October 28, 1909 (Goldman); Cliff, November 7-9, 1906; Cooney, November 25.

1889 (Barrell); Deming, December 3, 1889 (Bailey); Shiprock, February, 1907 (Gilman) and even as low as 3,700 feet at El Paso, Texas, February 6, 1892 (Mearns). [On the Rio Grande Bird Reserve it was noted, November 23–December 9, 1916 (Willett).]

In the spring migration, it was noted at Shiprock, March, 1907 (Gilman); Mesilla Park, 3,800 feet, March 20, 1903 (Metcalf); a specimen was taken at Silver City, March 15, 1914 (Kellogg); and one taken May 6, 1901, at Albuquerque (Birtwell).—W. W. COOKE.

NEST.—In holes in trees, and other places; bulky, made largely of sticks and lined with feathers. *Eggs*: Usually 5 to 7, white or pinkish; finely marked around larger end with reddish brown and lilac.

FOOD.—The Bewick Wrens of various subspecies eat less than 3 per cent of vegetable matter, or more than 97 per cent insects. Bugs make up nearly one-third of the total food, including leaf-bugs, stink-bugs, shield-bugs, leaf hoppers, tree hoppers, jumping plant lice, a member of the chinch bug family, and olive scale. Beetles amount to over 21 per cent, about 3 per cent ladybirds, nearly 10 per cent weevils, including the boll weevil. The stomachs of two contained 80 and 85 per cent of engraver beetles, which live under the bark of trees and do great damage to timber. Leaf beetles amount to about 8 per cent. Ants and wasps amount to about 17 per cent, caterpillars and a few moths and cocoons, about 12 per cent, grasshoppers, 4 per cent, spiders, 5 per cent.

GENERAL HABITS.—The Baird Bewick Wren, known by the strong white line over the eye and the white border of its long tail is common in some parts of the juniper belt. Two broods of young were seen out of the nest June 15, 1903, near Montoya, and the males were singing a bright vivacious song. On the San Francisco River at about 5,000 feet several were heard about the first of November, singing gaily in spite of the calendar. The vocal performances cover a singular mixture—a sweet melodious song very similar to that of the Song Sparrow, and a variety of harsh, loud, nasal, strident call notes given as it goes bobbing, with long jerking tail, through the low trees and bushes.

The Wren was common in thickets along the Gila River in October, Major Goldman found, and he says that about sunset one evening a dead one was discovered in the mouth of a rattlesnake that had just killed it.

Bewick Wrens of the various subspecies, when coming about houses and buildings, are ready to accept whatever hospitality is offered them in the way of building sites, from tin cans to horses' nose bags; and their return for small kindnesses is many fold.

ADDITIONAL LITERATURE.—FINLEY, W. L., American Birds, 91–101, 1907.—MERRIAM, F. A., A-Birding on a Bronco, 171–174, 1896.—TRAFTON, G. H., Methods of Attracting Birds, 47–48, 1910.

CACTUS WREN: *Heleodytes brunneicapillus couési* (Sharpe)

PLATE 57

DESCRIPTION.—*Length*: Adult male (skin) 7–8 inches, wing 3.3–3.6, tail 3–3.4, bill .8–1; tarsus 1–1.2. Female smaller. Tail rounded. *Adults*: Upperparts wood-

brown, feathers of back with white mesial streaks; wings barred, tail with middle feathers brown, barred with black, the rest blackish, more or less barred with white; line over eye white; underparts white anteriorly, shading into cinnamon-brown posteriorly, spotted with black. *Young*: Back spotted rather than streaked with white and spots on throat and chest much smaller and less intensely black.



From Biological Survey

FIG. 96. Domed Nest of Cactus Wren

Characteristically placed in protective cactus; here in cane cactus (*Opuntia arborescens*)

RANGE.—Lower Sonoran desert regions from southern parts of California, Nevada, Utah, Arizona, New Mexico, and Texas south to Lower California and other northern states of Mexico.

STATE RECORDS.—Throughout the lowest parts of southern New Mexico, the Cactus Wren is a common resident east to Carlsbad, and the Guadalupe Mountains below 5,500 feet (Bailey). It ranges north to Lower Penasco, Tularosa, and Engle (Ligon); San Marcial (Bailey); Silver City (Hunn); Redrock (Goldman); Carlisle (Barrell); and Cactus Flat (Bailey); [Monticello, San Marcial, Alamagordo, and Artesia (Ligon, 1916–1918).] It was found as high as 6,000 feet on the west and north slopes of Salinas Peak, December 9–20, 1902 (Gaut); but may not have nested up to that altitude, though it nests regularly to 5,600 feet at the base of the mountain. It nests to 6,000 feet at Silver City (Marsh); 5,500 feet at Dog Spring, Grant County (Mearns); and 6,200 feet in the Organ Mountains (Merrill). The nesting season is a lengthy one, for eggs were found on April 23, 1885, at Silver City (Marsh); on August 26, 1912, in the Jornada, near Cutter, at 5,000 feet and fresh eggs on August 27, 1912, at about 5,600 feet near Engle (Ligon).

In winter, on the Carlsbad Bird Reserve, it was noted in January, 1915, during the winter of 1915-1916 [common in December, 1916 (Willett)]. At the south end of the San Mateo Mountains, one was seen at Monticello, December 7-10, 1915 (Ligon); on the Rio Grande Bird Reserve (Elephant Butte), it was noted November 23-December 9, 1916 (Willett) 1.—W. W. COOKE.

NEST.—In cholla and cane cactus, yucca, catsclaw, mesquite, shrubby hackberry, blue thorn or other thorny bushes; retort-shaped, with horizontal, tunnel-like entrance; the globular chamber made of plant fibers lined with feathers, the entrance of straw-like plant stems. Eggs: 3 to 7, whitish or buffy, ground color often hidden by reddish brown spotting.

FOOD.—Vegetable, about 17 per cent, including weed seed, cactus fruit, elderberry, and cascara; animal, about 83 per cent, including ants and wasps, weevils, grasshoppers, bugs, black scales, caterpillars, and cocoons (one with lizard two inches long, T. I. Storer). "The bird sustains the good reputation of its family" (Beal).

GENERAL HABITS.—The large Cactus Wren, with his heavily spotted breast, caught sight of perhaps as he flies from a cactus or yucca to a thorny mesquite, adds a grateful touch of desert life to the interesting landscape with its strange plant forms, so marvelously adapted to their conditions. His song, which he sings with abandon—head thrown back and tail hanging—seems as shorn of ornament as the cactus, but, grating and monotonous as it is, harmonizes so well with his surroundings that he seems, indeed, to sing the song of the desert. In the hot dry days of summer, Professor Merrill says, he will find "a shady place in a tall bush or perhaps on a telegraph cross arm and intermittently for hours keep up his 'Chur-cha-ra, chur-cha-ra, chur-cha-ra, chur-cha-ra,' that sounds like milling two small granite stones together" (MS). In winter he is not quite so noisy as in summer, but apparently is never silent.

After crossing the arid plains where the cane cactus (*Opuntia arborescens*) grows, as on the desert-like tracts where the cholla cactus abounds, the appropriateness of the name Cactus Wren is impressed upon you, for the retort-like nests are seen on every hand. The little builders do not confine themselves to the many kinds of cactus, however, but nest in equally safe thorny bushes and sharp-bladed trees. The bayonet-pointed heads of the tree yucca (*Yucca radiosa*) are often chosen, judging by the number of places where we found the Wrens singing among them, notably at Deming, Silver City, Mangas Creek, Cliff, and Cactus Flat. Two nests seen were safely placed between the spears of adjoining yucca heads. It would have taken a brave owl indeed to disturb that mother Wren's slumbers! A tasteful nest found near Deming in a yucca top was made wholly of white yucca threads, with a billfull of Angora wool for lining. On the side of the San Andres Mountains, Mr. Ligon has found more aesthetic Wrens nesting in "desert roses," as the cane cactus is called.



From Biological Survey

CACTUS WREN
Singing the song of the desert

In southwestern New Mexico, where the nests were abundant in all suitable localities, Mr. Anthony found them usually in groups of from four or five to a dozen, six or seven often being seen in one mesquite. At first he supposed that the birds nested in colonies, but by watching discovered that a collection of nests would be used by one or at most two pairs of birds, the males presumably roosting in the dummy nests. The last of October he found the Wrens relining and thickening the walls and lengthening the tunnel-like entrances to their nests, and they kept on with their work during pleasant weather until the middle of December, when "all the nests in the vicinity were so thoroughly repaired that they had the appearance of new nests, ready to afford shelter during storms or cold, windy weather (1891, pp. 133-134). Two such nests were found by Mr. Bailey at Cactus Flat early in November, with freshly arranged dried grasses ready for occupancy on the cold dewy nights.

In southern Arizona one winter when I made a careful study of Cactus Wren nests, practically all the birds seen at the nests went to roost at sunset. On my twilight rounds, to my surprise a Baird Bewick Wren was twice flushed from one of its neighbor's nests. Thirty-five out of a total of sixty-four nests examined were not only protected by the entangling thorns of surrounding branches but were built within clusters of the red-flowered mistletoe, which, in many cases, partially or wholly concealed them. The nest is normally about twelve inches long. The globular nest chamber, about six inches in both diameter and length, as I noted, "in course of years becomes a thick felted mass of gray, weathered plant fibers so hard that saucer-like sections sometimes crack off from the back, showing the solid, sodden bottom of the nest. In one old globe examined, parts of eighteen species of plants were found.

The entrance to the nest chamber is made of long straw-like plant stems, which may easily get blown about and so often need replenishing. When the old nests are repaired and ready for winter use these new straw-colored entrances often afford a striking contrast to the old gray globes, although occasionally the new material is lavishly distributed over the whole top of the nest.

In relining, the Wrens often use the small gray body-feathers of the Gambel Quail and other birds. Scaled feathers of the Scaled Quail and yellow ones of the Verdin were found. One nest had its sleeping chamber so thickly lined with soft feathers that it suggested a feather bed. Sometimes, in the process of repair, for reasons best known to the little carpenter, the angle of the entrance was changed, in one case making the new nest face almost at right angles to the old. The contrast in angle was emphasized by the color difference, the old nest

chamber being gray and weathered, while the new entrance was straw colored (1922b, p. 165).

The protecting, dummy nests, it is said, are taken advantage of by rats, mice, and various small reptiles, and one investigator writes that he has "frequently been startled by reaching into a nest . . . and pulling out a ten inch lizard."

ADDITIONAL LITERATURE.—BAILEY, VERNON, *Animal Life of the Carlsbad Cavern*, 158-159, 1928.—EDWARDS, H. A., *Condor*, XXI, 65-68, 1919 (losses to breeding birds).—WOODS, R. S., *Bird-Lore*, XXVI, 2-3, 1924.

WESTERN MARSH WREN: *Telmatodytes palustris plésius* (Oberholser)

DESCRIPTION.—*Wing*: 2.1 inches, tail 1.8, bill .5. *Adults*: *Top of head and fore-back black, back streaked with white*, rest of back pale brown, upper and lower tail coverts and middle tail feathers heavily barred; line over eye whitish, underparts grayish. *Young*: Crown and foreback black without white streaks.

RANGE.—Breeds mainly in the arid Upper Sonoran Zone from British Columbia (east of Cascades) and western Montana south to New Mexico and northeastern California; winters from British Columbia (a few), Utah, California deserts, and central Texas south to Tamaulipas, Sinaloa, and Cape San Lucas. Recorded from Arizona.

STATE RECORDS.—There are few places in New Mexico that offer the conditions desired by the Western Marsh Wren and it occurs only locally in the State. The type specimen was taken September 24, 1888, at Fort Wingate (Shufeldt); but the species is here a migrant. [At Lake Burford one was seen May 27, 1918 (Wetmore).] It was common at Lake La Jara and Lake Burford October 2, 1904, and an old nest found at Lake La Jara showed that it breeds there. It probably also breeds in the tules around the spring at San Rafael, where it was found common October 26-31 1908 (Bailey). In addition it has been noted at Lake Piedra, September 13, 1874 (Henshaw); on the Rio Puerco near the mouth of the Rio San Jose, September 6-7, 1905 (Hollister); at Santa Rosa, October 3, 1902 (Gaut); and at Mesilla, October 16, 1913 (Merrill).

The species probably winters south of New Mexico. On its return in the spring it was taken on April 8, 1892, at Lake Palomas close to the southern boundary (Mearns); and arrived at Albuquerque on April 6, 1900 (Birtwell). It was common there the following week.—W. W. COOKE.

NEST.—In colonies; large and globular with entrance on the side, fastened to tule stalks and woven of wet tule stems, with wet grass and algae matted in and with a lining of dry algae and tule pith. *Eggs*: 5 to 10, thickly dotted with chocolate-brown.

FOOD.—(Marsh Wrens of various species.) Almost wholly insects, including beetles, wasps, ants, bugs, caterpillars, flies, grasshoppers, and spiders. Small mollusks are also eaten. "The bird is to be ranked among our eminently useful species . . . many harmful species of insects breed and live in marshes and waste places . . . so that the birds which destroy them on wild land are removing the source of supply from which are recruited the hosts that infest the farm" (Beal).

GENERAL HABITS.—A few tule-bordered lakes in the arid interior explain the otherwise anomalous presence of the Western Marsh Wrens in New Mexico. Colonies of these vivacious, jolly little song-

sters, easily recognized by the white chalk marks on their black backs, and their doubled-back tails, were found at Lake La Jara and Lake Burford, but neither at Boulder nor Horse Lakes, as there were no tules for them to live in. At the Burford Lakes one would fly out in the border of weeds looking for insects, but when surprised would dart back into the tules and, like a pygmy, stand at the foot of one of the long stalks with white throat raised, watching developments.

The Wrens were still common during late October, 1908, Mr. Bailey found, in the tules around the spring at San Rafael, and "often came up in the morning sunshine to grind out their little rattling, squeaky song with almost springtime glee. They must breed there in great numbers" (MS).

CANYON WREN: *Cathérpes mexicánus conspérus* Ridgway

PLATE 58

DESCRIPTION.—*Length: 5.5-5.7 inches, wing 2.2-2.4, tail 2-2.4, bill .7-.8, tarsus .6-.7. Adults: Brown, except for white throat and breast; upperparts light brown, grayish on head, everywhere dotted with small dusky and whitish spots; tail rusty brown crossed with narrow black bars; wing quills dark brown barred; anterior underparts pure white, shading below into rusty brown.*

RANGE.—Upper and Lower Sonoran Zones of Great Basin and Rocky Mountain region from British Columbia (local), eastern California, along desert ranges, Nevada, Utah, and Colorado south to western Texas, Chihuahua, Sonora, and Lower California.

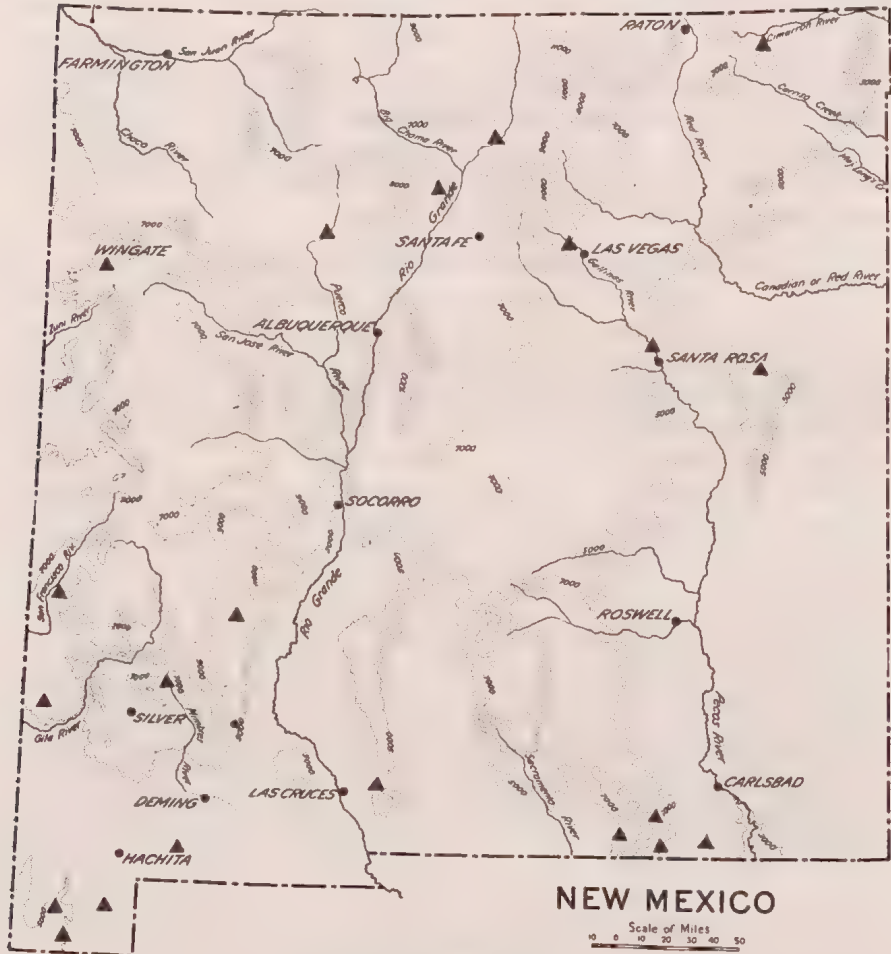
STATE RECORDS.—No general migration is performed by the Canyon Wren in New Mexico, but it is a great wanderer and when met with outside of the nesting season may be far from its nesting site. [It is well scattered over the State and common in suitable places where there are deep, rough canyons (Ligon, 1916-1918); common near the foot of La Bajada Hill and in Canyon el Diablo near Buckman (Jensen, 1922).] It ranges north and south across the State and east to Dark Canyon and the Carlsbad Caves, at the east base of the Guadalupe Mountains (Bailey); Bear Canyon, San Andres Mountains, and Gran Quivira (Gaut); Santa Rosa (Bailey); Las Vegas (Batchelder); and near the base of Sierra Grande (Howell). It ranges up the Rio Grande to Rinconada (Surber); and in northwestern New Mexico to the lower edge of the yellow pines in Santa Clara Canyon, and up the Puerco Valley to near Cabezon (Bailey); [Lake Burford (Wetmore, 1918)]; and to Gallup (Birdseye). It probably occurs also locally in the extreme northwestern part of the State, for it is fairly common in southwestern Colorado. Near Chloride, at 6,000 and 6,300 feet, young were found in the nest May 31, 1913 [nests were found May 16 and 26, 1916 (Ligon)]. The larger part seem to be placed between 5,500 and 6,500 feet.

In the fall, the species was found September 10, 1914, at Fort Bayard (Rockhill); October 17, 1906, as high as 7,800 feet on Silver Creek just east of Mogollon in the Mogollon Mountains (Bailey); and September, 1908, as low as 4,500 feet at the base of the Little Florida Mountains (Goldman).

[In winter it was common on the Rio Grande Bird Reserve November 23-December 9, 1916; several were found in the Guadalupe Mountains at about 6,500 feet, January, 1915 (Willett); and they were quite common in the canyon at Cur-rumpa, January 15 and 19, 1894 (Seton).—W. W. COOKE.

NEST.—In crevices of rocks, on a ledge in a tunnel or cave, or about buildings; made of twigs and moss or grass lined sometimes with feathers and wool. *Eggs*: 3 to 5, white, spotted chiefly around the larger end with reddish brown and lilac-gray.

GENERAL HABITS.—If a Canyon Wren flies down its cliff to drink from the camp brook or strays out to a Mexican hamlet, as sometimes



MAP 46. CANYON WREN
Triangles mark breeding and probable breeding records

happens in the fall, it may be seen near enough to note the contrast between the pale gray of the Rock Wren living in the open and the rich rusty brown of this dweller among canyon shadows.

A pair that Doctor Wetmore watched when building on a sandstone ledge in a gulch near Lake Burford were seen close at hand. In describing his experience the Doctor writes: "The female was working busily carrying nesting material into a rock crevice, while the male remained nearby but made no effort to assist her. Once as the female



From Handbook of Birds of the Western United States

CANYON WREN

The amazing little bugler of great silent depths

passed him he ran out across the rock face with spread tail, and wings partly open and trailing, giving a low cheering note. And at short intervals I heard his fine song ringing through the woods. The female ceased her labors once and sat for a few minutes in the warm sun to preen her feathers, finally resting for some time with eyes partly closed, apparently almost asleep." When the Doctor first examined the nest, although it was empty, the female remained on it as he climbed noisily over the rocks and until he had nearly touched her. The nest was a bulky one, measuring eight inches across the base and being about three inches high. "The foundation," he noted, "was composed of a dozen or more small twigs, upon which were placed moss and masses of spider webbing with bits of leaves, catkins and bud scales. The lining was composed of a heavy felting of sheep's wool, most of it white, though a few bits of dark brown wool were mixed through it. In addition . . . were a few feathers of Great Horned Owl, Violet-green Swallow, and Cassin's Finch" (1920a, pp. 410-411). At the famous Carlsbad caves, early in spring, Mr. Bailey found a pair roosting down in the ladder shaft, but later, when more people climbed the ladders, they moved to the great doorway of the big cave. Nests were found in the roofs of several caves.

A nest that was found by Mr. Ligon at 6,300 feet on Chloride Creek was near the canyon bed but well protected under a hanging rock. Though both parents were "busy feeding the youngsters, still the male found time for occasional songs" (MS). Sometimes the song is given when the bill is bristling with the wings and legs of insects collected for the brood in the nest.

Even the approach of winter does not silence the little Wren's rapturous song, and when one is traveling through his country during the autumn, it may be heard almost daily. High up in the Mogollon Mountains one was singing, even after the first snows had fallen.

In his home the Canyon Wren is more often heard than seen, for among towering cliffs and deep canyons his tiny form is often invisible among the rocks, while his loud bugling voice rings out triumphantly. Scale-bird, he has been well called, for his clear liquid notes drop down the chromatic scale. They are preluded and concluded with a short flourish of grace notes, but the vibrant ringing scale is what one remembers.

ADDITIONAL LITERATURE.—MILLER, O. T., *A Bird-Lover in the West*, 72-74, 86-89, 1894.—TORREY, BRADFORD, *Nature's Invitation*, 280-283, 1904.

ROCK WREN: *Salpinctes obsoletus obsoletus* (Say)

PLATE 59

DESCRIPTION.—*Length:* 5.1-6.3 inches, wing 2.7-2.8. *Adults:* Upperparts dull grayish brown, finely flecked with black and white dots; rump light brown, tail graduated, tipped with buffy brown, and with subterminal black band; middle tail

feathers, narrowly barred with blackish; underparts dull whitish, brownish on flanks, chest usually lightly streaked. *Young in juvenal plumage:* Unmarked, except for inconspicuous dusky bars on back.

RANGE.—Breeds mainly in arid Transition and Sonoran Zones from southern British Columbia (east of Cascades), west-central Alberta, southwestern Saskatchewan, and western North Dakota south to western Iowa (casually), central Texas, San Luis Potosi, Zacatecas, and Lower California; winters in the southern part of its United States range and in Mexico.

STATE RECORDS.—Judging from the number of records the Rock Wren is one of the commonest birds in New Mexico. It breeds throughout the State east to the Guadalupe Mountains (Bailey); Sacramento and White Mountains (Hollister); Capitan Mountains to 7,500 feet (Gaut); Santa Rosa and Cuervo (Bailey); near Las Vegas at 8,000 feet (Mitchell); near Koehler Junction (Kalmbach); and undoubtedly on the Sierra Grande (Howell). It breeds normally from about 8,000 feet, Tres Piedras (Gaut); and Hondo Canyon, down to 4,600 feet at Santa Rosa (Bailey); 5,000 feet at Carlisle (Barrell); and 5,000 feet at Shiprock (Gilman). It breeds most commonly at 6,000–7,500 feet. A family was seen August 18, 1904, at 9,600 feet on Comanche Creek in the Red River Valley (Bailey). A few were seen August 9, 1905, on the summit of Mount Taylor, over 10,000 feet (Hollister); one was noted August 13, 1903, almost at the top of Pecos Baldy, 12,500 feet (Bailey); [they were common on peaks above timberline in the Sangre de Cristo Range, June 18–19, 1924 (Ligon).]

The nesting dates vary widely; eggs were found April 28, 1885, at Silver City (Marsh); and on June 26, 1903, near the head of the Conchos River some 10 miles northwest of Cabra Springs. Young were being fed in two nests near Santa Rosa up to May 30, 1903; one brood came out at the next camp, Agua Nigra, June 6, and a fourth brood was found the same day with tails fairly well grown (Bailey). [A finished nest was found, June 26, 1921, in the deserted Pecos Pueblo (Jensen). Young were seen May 16, 1916, at 6,200 feet at Chloride; July 3, 1917, young almost feathered at 5,500 feet, 12 miles northeast of Hillsboro; July 4, 1917, feathered young in the Black Range, 8 miles northwest of Hillsboro (Ligon)]; while young were still in the nest, August 25, 1903, near Pecos (Bailey).

In the fall they were seen September 21, 1906, on Mount Taylor at 11,300 feet in the San Mateo Mountains; others September 6, 1904, at about 9,000 feet in the San Juan Mountains, and October 18, 1906, at 9,000 feet in the Mogollon Mountains above Willow Creek (Bailey).

The species does not usually winter in northern New Mexico, but in 1882 it was seen as late as December 22 at Las Vegas (Batchelder). It probably sometimes winters in the southern part of the State in the Organ Mountains (Merrill); Silver City (Hunn); and Apache (Anthony). Even in winter it does not seem to descend to a much lower altitude than the lowest part of the breeding range, except in the lower Rio Grande Valley, where it was noted November 23–28, 1909, near Las Cruces (Goldman). On the Carlsbad Bird Reserve it was seen occasionally in January, 1915, it was noted in the winter of 1915–1916 [and was common in December, 1916; also on the Rio Grande Bird Reserve it was abundant November 23–December 9, 1916 (Willett).]

The first migrant noted in the spring of 1884 at Silver City was on March 11 (Marsh), and at Las Vegas in 1902 on April 12 (Atkins).—W. W. COOKE.

NEST.—Usually in clefts or crevices among rocks, under rocks, or sometimes in hollow stumps or about buildings, at times with a foundation of small stones; the outside made of weedstalks and grasses with a layer of rootlets and strips of bark, the inside sometimes cupped with goat hair or wool. *Eggs:* 6 to 8, white,



From Handbook of Birds of the Western United States

THE SPRIGHTLY ROCK WREN

A friendly little comrade of the camper among the rocky mesas of the desert. The rock on which he stands is appropriately decorated with resurrection plants, uncured from a tight brown ball by resurrecting rain

finely spotted on or around the larger end and sometimes over the entire egg with reddish brown.

FOOD.—Mainly harmful insects, including, by one record, 86 per cent of grasshoppers. Young fed with locusts in Nebraska.



MAP 47. ROCK WREN

Triangles mark breeding and breeding season records mainly in Upper Sonoran Zone

GENERAL HABITS.—The sprightly Rock Wren, with inconspicuous rock colors for its enemies, set off by a black crescent on its tail for following friends, who greets you with a fearless jerky bob, is a familiar figure among the sandstone ledges, side canyons, and barren rocky mesas of New Mexico, where its purring note from the rocks has a most friendly sound to the passing wayfarer. Besides its purr, it has a variety of calls. One of its common songs is a harsh *kra-wee, kra-wee*,

kra-wee-kra-wee that might become pleasing by long association with its cheery little self.

It was abundant in the canyons near Santa Rosa in 1903, where we found eight nests, two on the ground under stones and the rest in crevices or holes in rocks. The birds have the curious habit of using bits of stone at the entrance of the nest, both as a wide pavement leading to it and as a border to the nest itself. In two nests that we found there were over eighty pieces of stone, varying from one-half to one-and-a-half inches in length. One contained two hundred and sixty stones and a quart of sticks and lining material. In a nest we discovered in the wall of the ruined church of Pecos Pueblo, fragments of Indian pottery were used instead of stones (1904a, pp. 68-70). Whatever the purpose of the stones and pottery, they must help in marking the particular crevice of the nesting site in a sandstone wall full of innumerable crevices.

A nest found by Mr. Anthony was several feet below the surface of the ground in a mine actually being worked, night and day. How the nest and eggs escaped being destroyed by the blasts, which were fired within a few yards of them several times each day, he says, was a puzzle to him (1892, p. 368).

The Wrens met with at our camps had a delightful air of frank fearlessness, allowing themselves to be photographed at short range—one pair at four feet—coming about camp and perching on the wagon top looking for insects for their young. One came tripping down the face of a rock mass with its bill bristling with moth wings, and parents are said to feed their nestlings grasshoppers, and green caterpillars.

A pair with three young, found by Mr. Gaut along a rocky arroyo west of Tres Piedras, made a pretty picture, the little ones sitting side by side on a dead log, while their parents were busily engaged looking for food about the numerous logs and rocks surrounding them. Near Santa Fe the friendly Wren is said to frequent the neighborhood of gardens.

ADDITIONAL LITERATURE.—BAILEY, F. M., *Condor*, VI, 68-70, 1904.

THRASHERS, MOCKINGBIRDS, etc.: Family Mimidae

The Mimidae are a strictly American family, most of which are restricted to the Tropics. The New Mexico representatives of the family are large, mainly brown or gray birds, from eight to twelve and a half inches long. Their bill, with well developed rictal bristles, is sometimes curved or notched near tip. Their wings are short and rounded, their tails large and rounded, and their feet stout in adaptation to partly terrestrial life. In general habits they resemble the Wrens, living in shrubbery near the ground, the plain colors of the

males, which are like the females, protecting them in their brushy environment and when they sing in the open. The Mockingbird is the most famous singer among them, but they all have good voices (Coues).

WESTERN MOCKINGBIRD: *Mimus polyglottos leucópterus* (Vigors)

DESCRIPTION.—*Male:* Wing 4.3–4.7 inches, tail 4.5–5.3, bill .6–.7. *Female:* Wing 4.2–4.6 inches, tail 4.4–5.1, bill .5–.7. *Adults:* Upperparts grayish drab, wings and tail blackish, wings with large white patch at base of quills, and wing bars, tippings, and edgings white, outer tail feathers largely white; underparts white, washed with clay-color; iris pale yellow. *Young:* Upperparts brown, breast and sides thickly spotted with dusky.

RANGE.—Breeds chiefly in Sonoran Zones from central California, southern Wyoming, and northwestern Nebraska south to Oaxaca and Cape San Lucas.

STATE RECORDS.—The Western Mockingbird is one of the common birds of New Mexico, breeding north to Montoya, Anton Chico, Taos (Bailey); Rinconada (Surber); [Santa Fe (Jensen)]; Chama River (Ligon); and Farmington (Knowlton).

[It is most abundant along the Rio Grande from Albuquerque south; very abundant about Palomas Springs (Ligon, 1916–1918).] It nests from 3,800 feet at Mesilla Merrill; to 7,000 feet at Taos (Bailey); to 7,200 feet at Inscription Rock (Henshaw); [and 7,500 feet near San Mateo, north of Mount Taylor, nesting in June (Ligon, 1916–1918).] On the Carlsbad Bird Reserve it was plentiful, April 27, 1914 (Cooper). [From Silver City to the Mexican boundary it was common May 6–10, 1920 (Ligon). At Lake Burford, May 23–June 19, 1918, it was fairly common, nesting (Wetmore). It nests around Santa Fe about the same time (Jensen, 1923).] A nest with six eggs was found at Cooney, April 19, 1890 (Barrell); one egg, June 7, 1903, at Santa Rosa (Bailey); one egg, June 8, 1913, at Chloride (Ligon); many dead young in nests on the Pecos River, June 20, 1913, killed by a heavy hailstorm (Ligon); it nests from the latter part of May to late in July at Mesilla Park (Merrill). [In the Pecos Valley it was found between Roswell and Fort Sumner, June 16–21, 1918 (Ligon).]

Outside of the breeding season it ranges to 9,000 feet at Cloudercroft, July 19, 1901 (Fuertes); and to 10,000 feet in the Mogollon Mountains (Metcalf).

During the winter it is fairly common at Mesilla (Merrill), and a few remain at this season even as high as 6,000 feet at Silver City (Marsh). It is strictly migratory in northern New Mexico and leaves for the south in the early fall; one was seen near Koehler Junction, August 9, 1913 (Kalmbach); another near Santa



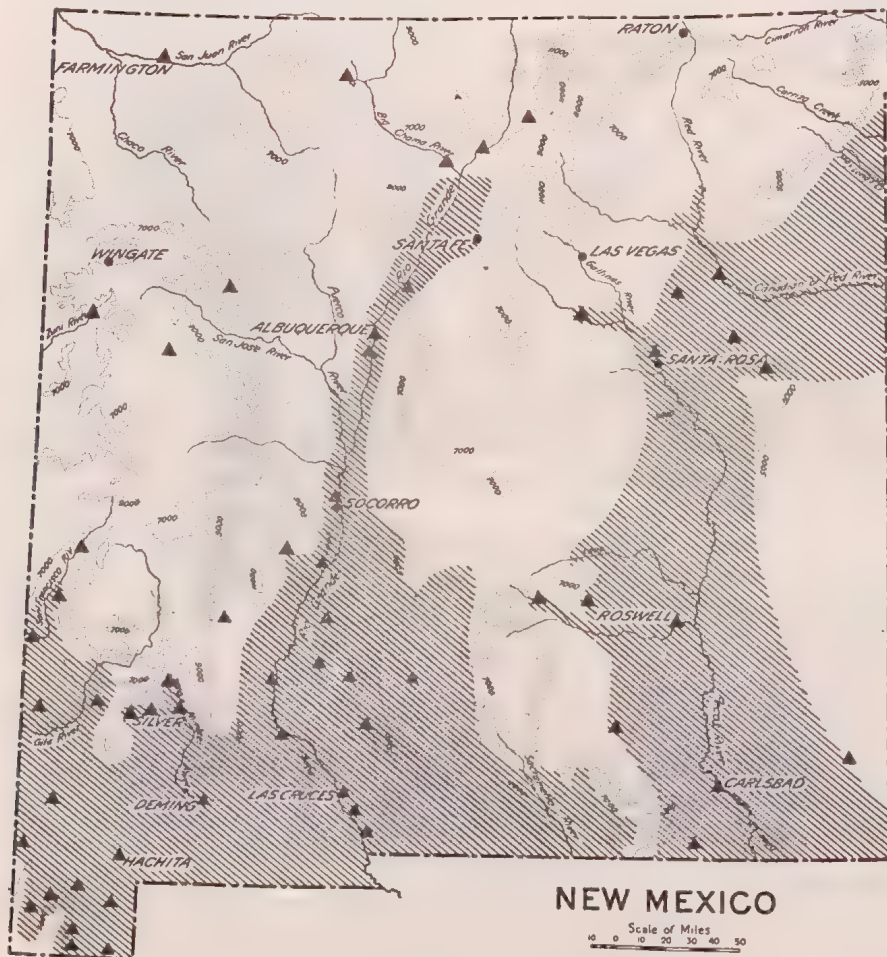
From Biological Survey

FIG. 97. Mockingbird (*Mimus polyglottos polyglottos*)

Singing in every feather

Rosa August 16, 1906 (Bailey); [several were seen near Gallup, September 30, 1916; it was noted near Whitewater Creek, October 1, 1916 (Skinner)]; and one near Largo Canyon October 2, 1906 (Bailey).

In the spring it returned to Carlisle, April 16, 1890 (Barrell); on the Carlsbad Bird Reserve it was plentiful, April 27, 1914 (Cooper); and returned to Rinconada



MAP 48. WESTERN MOCKINGBIRD

Shaded areas show main breeding range. Triangles outside of shaded areas mark scattered breeding records

May 1, 1904 (Surber). [From Silver City to the Mexican boundary it was common May 6-10, 1920 (Ligon).]—W. W. COOKE.

NEST.—In thick bushes, hedgerows, vines, thorny trees, or cholla cactus (one in a San Diego rural route mail box); bulky, made of twigs—often thorny ones—grasses and leaves, lined with finer materials, sometimes gray moss. *Eggs*: Usually 4, pale bluish or greenish, heavily freckled with several shades of brown.

FOOD.—Less than a fourth is animal matter, but it includes many injurious insects, as grasshoppers, crickets, caterpillars, beetles, cutworms, cotton worms, the chinch bug, rice weevil, and cotton-boll weevil. Its vegetable food, in cultivated

regions, includes a variety of small fruits, but apparently these could be protected by planting, between the rows of fruit, mulberry and some of its wild foods, as dogwood, pokeberry, elderberry, and prickly pear. The seeds of hackberry, red cedar, and holly are also eaten.

GENERAL HABITS.—The mimetic powers, the rare nocturnal concerts, amusing acrobatic feats, and ready friendliness of the Mockingbird have made him a prime favorite wherever found; and the people of New Mexico may well congratulate themselves that he is listed among their common birds.

Between Santa Rosa and Montoya, in 1903, we found him abundant everywhere except on the plains. Three nests that we found showed the usual discrepancies in dates—one contained eggs, June 14, 1903, and the others, June 12 and 17, nearly feathered young. One nest was made of thorny lysium sticks, and one, found at the juniper edge of the Staked Plains, was made of such large twigs and was so bulky that we took it for a Woodhouse Jay's nest before finding the owner at home. On June 28, on the Conchas, we saw a nest with young in a cactus.

One of the Cuervo Mockers was the best mimic I have ever heard, if none of the notes attributed to others were part of his personal repertoire. The *killy-killy* of the Sparrow Hawk seemed to appeal to his sense of humor, and he would hit it off to perfection, often prefacing his song with it when in his most jovial mood. Of his other neighbors, he mimicked the Nighthawk, Beebird (one of the western Kingbirds), Gray Titmouse, and the Pinyon Jay. But what interested and puzzled us most was his reminiscent mimicry—if it were such. The alcove in which he lived, just an old river cove cut into the wall of the Staked Plains, was so circumscribed that we ought to have made its complete bird census, and none of us saw either the Green-tailed Towhee or the acorn-eating Mearns Woodpecker; but the mewing call suggesting the Towhee and the *ja-cob* of the Woodpecker were among the choicest selections on the Mockingbird's list. Interrogated cowboys, when shown a picture of the Woodpecker, said they thought they had seen it there, and told us that in the high plains of the Canadian River, about fifty miles to the north, there were yellow pines—and, by inference, oaks—where the Towhee as well as the Woodpecker might breed. If they did they might possibly come down into the Mocker's country after the breeding season, at which time the hospitable musician could improve the opportunity to add their notes to his list. At Montoya, another Mocker had such a perfect Rocky Mountain Nuthatch call that it made me stop involuntarily a number of times. He also gave the *ka-ruck-uck* of the Woodpecker, but apparently had forgotten the *ja-cob*. The Woodhouse Jay's note seemed a favorite one for mimicry. But after all, who knows? Perhaps we were the ones who had *ja-cobs*

and towhee mews on the brain, and the jaunty, iterant Mockers was just practicing scales!

Another possible phase of mimicry was suggested to us by Mr. Delgar at Joseph, whose wife used to take young Mockers from the nest and raise them for pets. One, as he expressed it, got so that it would "talk," imitating the names of a dog and a child heard in constant use.

The Mockingbirds are notably numerous at Mesilla Park in the summer and are frequently seen in winter, Professor Merrill writes, "especially in the thickets in the valley. They live on insects, fruit, berries, and seeds. In the cactus garden at the college they are particularly fond of the ripe tunas and get the purple-pink stain nearly all over their heads while pecking the fruit out of its skin. They nest irregularly from the latter part of May to the latter part of July" (MS).

Families of young birds were seen by Mr. Huey in the San Felipe region of Lower California as early as the latter part of March. Here, the parasitic mistletoe in the ironwoods supplied them with abundant food, and Mr. Huey found that "the heaviest laden trees were constantly guarded by them against the inroads of the more numerous Phainopeplas (1927, p. 36).

ADDITIONAL LITERATURE.—DICKEY, D. R., *Condor*, XXIV, 153-157, 1922.—EMERSON, W. O., *Bull. Nuttall Orn. Club* (= *Condor*, vol. 1), 27, 1899.—HARRINGTON, A. B., *Bird-Lore*, XXV, 310-312, 1923.—PEARSON, T. G., *Educational Leaflet* 41, *Nat. Assoc. Audubon Soc.*—MILLER, O. T., *In Nesting Time*, 35-64, 1893.

CATBIRD: *Dumetella carolinensis* (Linnaeus)

DESCRIPTION.—*Length*: 8-9.3 inches, wing 3.4-3.7, tail 3.7-4.2, bill .6-.7, tarsus 1-1.1. *Adults*: Dark slate-gray, crown and tail black; under tail coverts dark reddish brown. *Young in juvenal plumage*: Similar, but duller, and under tail coverts lighter.

RANGE.—Breeds mainly in Transition and Austral Zones from central parts of British Columbia, Alberta, and Saskatchewan, southern Manitoba, central Ontario, southern Quebec, and Nova Scotia south to northern Florida, eastern Texas, northeastern New Mexico, northern Utah, and northeastern Oregon; winters from southern States to Bahamas and Cuba, and through Mexico to Panama. Recorded from Farallon Islands.

STATE RECORDS.—New Mexico lies at the extreme southwestern part of the breeding range of the Catbird, and the species is confined in the breeding season to the northern part of the State. Here it was found with eggs in the nest June 4, 1904, at Rinconada (Surber); and feeding young in the nest July 14-15, 1904, along Pueblo Creek near Taos (Bailey); [a pair was found feeding young, June 24, 1918, in a garden in the San Juan Pueblo; a nest with four fresh eggs was found, June 13, 1921, in cottonwoods on the Santa Fe River in the city of Santa Fe; and on June 15, 1922, a third nest with five eggs was found in a tangle of willows and vines a mile from the second (Jensen). Several were seen and a pair feeding young out of the nest, July 8, 1919, on the Pecos, a mile above old Pecos (Ligon).] Two birds were seen about May 7, 1907, at Shiprock (Gilman); and one August 18, 1906, at Espanola (Bailey).

They probably enter the State from the east and do not occur in southern New Mexico even in migration.—W. W. COOKE.

NEST.—In bushes, made of sticks, leaves, bark, and rootlets. *Eggs*: Usually 4, deep greenish blue, unspotted.

FOOD.—Adults: insects, 44 per cent; vegetable matter, 56 per cent, fruit (wild and cultivated). "In most parts of the country it does far more good than harm" (Beal). Nestlings: insects, 96 per cent, largely injurious species (Gabrielson).

GENERAL HABITS.—Closely related to the Mockingbird and with a song that does its relationship no great discredit, the Catbird has acquired its unfortunate name from its mewing call. In cultivated districts it becomes one of the familiar favorites of shrubbery and gardens, coming readily to drink and bathe in the bird bowls offered for its comfort. It is interesting to hear that it has been found nesting, off College Street, in the city of Santa Fe.

Near the Taos Pueblo, where a number of the birds were seen, as we drove along the road we were attracted by the outcries of a pair, and in the adjoining thicket found the nest, empty except for the pitiful little decapitated body of the last young one; the murderous villain having slunk out of reach.

ADDITIONAL LITERATURE.—FRY, H. J., *Auk*, XXXIII, 29-31, 1916 (song, rise and decline).—GABRIELSON, I. N., *Wilson Bull.*, XXV, 166-187, 1913 (nest life).—HERRICK, F. H., *Home Life of Wild Birds*, 76-79, 1901.—STONE, WITMER, *Educational Leaflet No. 70*, Nat. Assoc. Audubon Soc.—WHITTLE, H. G., *Auk*, XL, 603-606, 1923 (nesting).

CURVE-BILLED THRASHER: *Toxostoma curvirostre curvirostre* (Swainson)

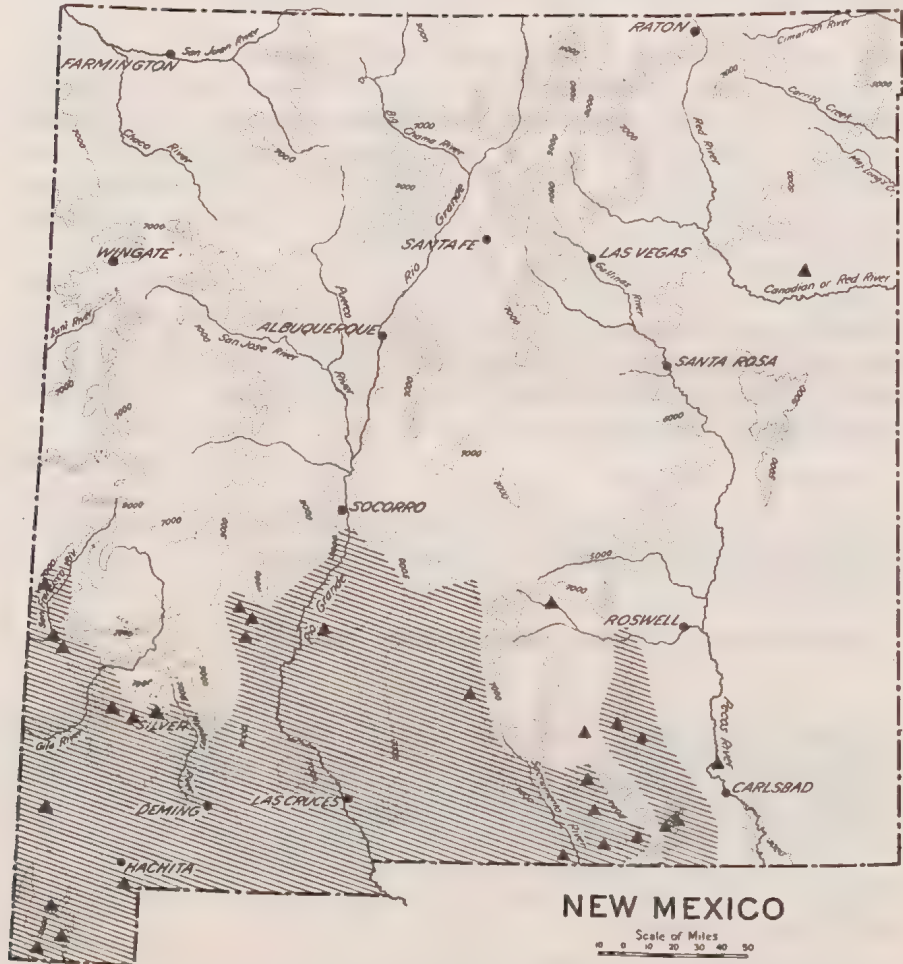
PLATE 60

DESCRIPTION.—*Length*: About 10.5-11.4 inches, wing 4.1-4.5, tail 4.4-4.6, bill 1.1-1.3, tarsus 1.2-1.3. Bill not longer than head, curved. *Adults*: *Upperparts* light brownish gray; wings and tail darker brown, tail with four pairs of outer feathers strikingly tipped with white, wings with two narrow white bars; throat white, breast and sides thickly spotted and clouded with gray, flanks buffy; iris orange or red. In worn summer dress the wing bars and spotting of underparts are not evident. *Young in juvenal plumage*: Similar, but lower back and rump browner, underparts more streaked than in adult.

RANGE.—Arid parts of Sonoran and Tropical Zones from southern New Mexico and Texas south to Vera Cruz and Oaxaca.

STATE RECORDS.—The Curve-billed Thrashers of southwestern New Mexico are intermediates but nearer *curvirostre* than *palmeri*, and those of Cactus Flat and Silver City are almost pure *curvirostre*. The species is a common breeder in two sections of New Mexico, the first including the Guadalupe Mountains to 6,200 feet (Bailey); the salt flats west of them, and up the south end of the Sacramento Mountains as far north as Weed (Hollister); and Lower Penasco (Ligon); that is, to about 6,000 feet. A fully grown bird of the year was taken June 27, 1903, in the foothills of the Capitan Mountains (Gaut). The other area includes southwestern New Mexico north to Pleasanton, and Cactus Flat (Goldman); Silver City (Hunn); Fort Bayard (Wilson); and Chloride (Ligon). Eggs have been found at the last

three places; at Silver City April 8, 1885 (Marsh), and early in May, 1906 (Bailey); and near Chloride, 6,200 feet, June 1, 1913 (Ligon). [In 1917 it was found in "agar," or cane, cactus in which it generally nests—a nest with almost fresh eggs at 7,000 feet on Alma Mesa, 15 miles northwest of Alma; four fresh eggs June 9, near Chloride; five fresh eggs June 30, on Penasco River about 40 miles west of Artesia; May 18, and May 26, each four fresh eggs, near Fair View, at 6,300 feet. In the Cuchillo Hills,



MAP 49. CURVE-BILLED THRASHER

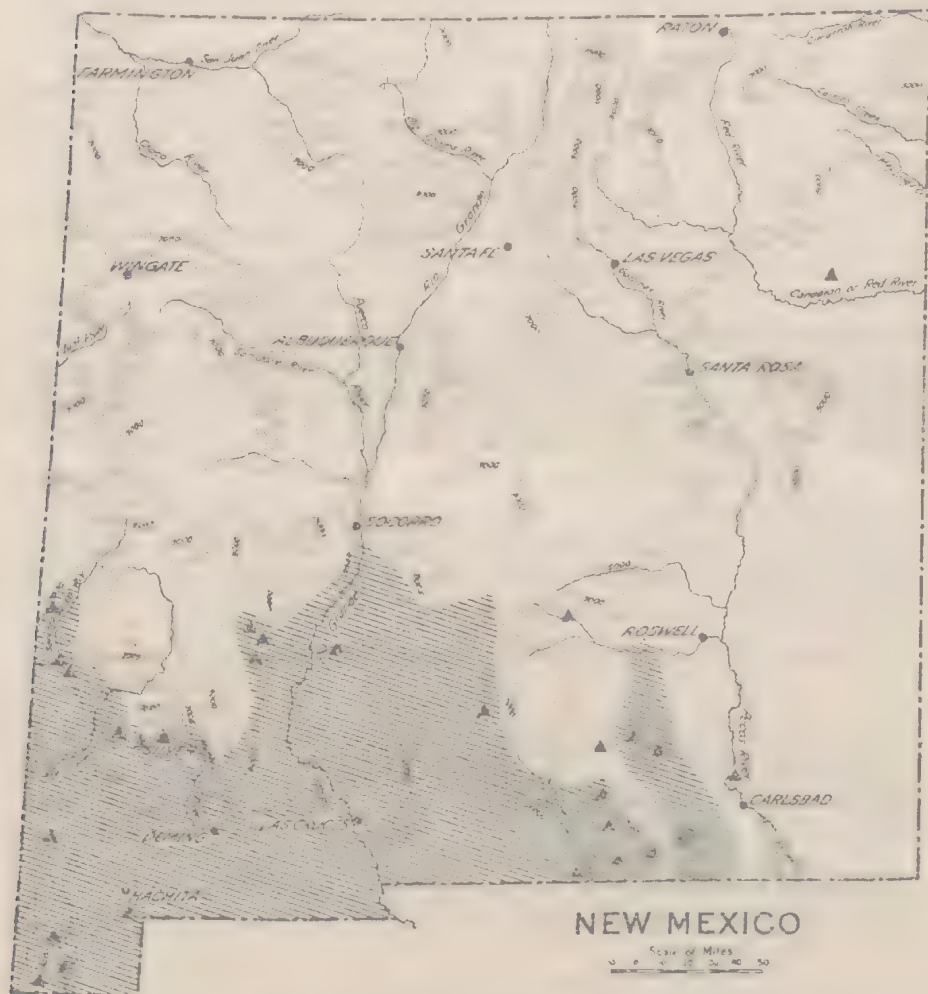
Shaded areas show general range. Triangles mark breeding and yearlong records

northeast of Fair View, a nest with three well incubated eggs was found August 4, 1919. It was observed May 6-10, 1920, throughout the Animas Mountains and Burro Mountains, where nests with 1 to 4 fresh eggs were found (Ligon).]

After the breeding season it has been recorded, in 1908, from Animas Peak at 5,800 feet, August 5-8 (Birdseye); Adobe Ranch, July 27, and the upper end of Mangos Valley to 5,600 feet September 15-23; Cactus Flat, common October 13-14, and Pleasanton October 17-18, (Goldman); in 1893, Apache, tolerably common,

ELF OWL CURVE-BILLED THRASHER
CRISSAL THRASHER

three places; at Silver City April 8, 1885 (Marsh), and early in May, 1906 (Bailey); and near Chloride, 6,200 feet, June 1, 1913 (Ligon). [In 1917 it was found in "agar," or cane, cactus in which it generally nests—a nest with almost fresh eggs at 7,000 feet on Alma Mesa, 15 miles northwest of Alma; four fresh eggs June 9, near Chloride; five fresh eggs June 30, on Penasco River about 40 miles west of Artesia; May 18, and May 26, each four fresh eggs, near Fair View, at 6,300 feet. In the Cuchillo Hills,



MAP 49. CURVE-BILLED THRASHER

Shaded areas show general range. Triangles mark breeding and yearlong records

northeast of Fair View, a nest with three well incubated eggs was found August 4, 1919. It was observed May 6-10, 1920, throughout the Animas Mountains and Burro Mountains, where nests with 1 to 4 fresh eggs were found (Ligon).]

After the breeding season it has been recorded, in 1908, from Animas Peak at 5,800 feet, August 5-8 (Birdseye); Adobe Ranch, July 27, and the upper end of Mangos Valley to 5,600 feet September 15-23; Cactus Flat, common October 13-14, and Pleasanton October 17-18, (Goldman); in 1893, Apache, tolerably common,



ELF OWL CURVE-BILLED THRASHER
CRISSAL THRASHER

April, October, and November (Anthony); San Luis Mountains September 22–October 2 (Mearns); and in 1912, a specimen taken at Silver City, October 18 (Kellogg).

A few may occasionally remain through the winter in New Mexico, but most desert the State at this season. [One was seen a few miles from Carlsbad on December 17, 1916 (Willett).]

NEST.—In bush cactus, tall yuccas, and thorn brush, made of thorny twigs lined with a few grasses or grass roots. *Eggs*: 3 or 4, pale bluish green, finely and uniformly speckled with brown.

GENERAL HABITS.—The short wings and long, tilting tail of the clay-colored Curve-bill give it the characteristic Thrasher flight. Its two-syllabled, liquid call is one of the dominant notes, and its song is one of the richest of its country. When we were photographing one of its big thorny nests, the disturbed parent came so near we could see the bright red of its eyes.

Along the Penasco River east of Lower Penasco, Mr. Ligon found these Thrashers common June 20, 1913, among the jointed cactus that grew in the thickets. As he says, the wide smooth valleys between the hills were full of these cactuses, and the birds were nesting in them, making bulky nests of sticks, lined with grass. He writes: "A terrific hailstorm had preceded me by about ten days, and I found many young dead in the nests. Last July I found these birds nesting abundantly west of the Guadalupe Mountains about Orange and northwest, always nesting in the cactus" (MS).

In the Carlsbad Cave region, where Mr. Bailey found them common, he found them feeding largely on fruit and ground insects, which seemed to make them "comparatively independent of visible water supply" (1928a, p. 158).

BENDIRE THRASHER: *Toxostoma bendirei* (Coues)

DESCRIPTION.—*Length*: About 9.5–10.5 inches, wing 3.9–4.2, tail 4.2–4.9, bill .9, tarsus 1.3–1.4. *Adults*: *Upperparts* pale grayish brown, tail dark brown, outer feathers tipped with white; wings with indistinct bars; underparts buffy or brownish white, palest on throat and belly, rusty brown on flanks and crissum, indistinctly spotted with brown; the breast alone marked with small brown arrow head spots; iris yellow; under mandible pale brownish at base. In very worn plumage the wing-bars are not evident and the spots of the underparts are barely observable. *Young*: Similar, but wings and rump rusty or tawny; underparts narrowly streaked.

RANGE.—Breeds in Lower Sonoran deserts of southeastern California, eastern Arizona, and northern Sonora; winters south to northern Sinaloa.

STATE RECORDS.—A single specimen taken at Hachita August 12, 1908 (Bailey), was the first sure foundation for including the Bendire Thrasher in the list of New Mexico birds. A specimen was, however, taken April 21, 1892, in the Carrizalillo Mountains just south of the boundary and about 85 miles west of the Rio Grande (Mearns); [a nest with three fresh eggs was finally found, June 18, 1926, 10 miles northeast of Rodeo, Hidalgo County (Ligon).] The species occurs regularly and commonly in southeastern Arizona not far from the New Mexico line.—W. W. COOKE.

NEST.—In bushes, mesquite, mistletoe, palo verde, catsclaw, or cactus, small and compactly built for a thrasher, of sticks and grass lined with soft materials such as grass, horsehair, rootlets, wool, or feathers. *Eggs*: 3 or 4, clay-color, drab, or greenish, spotted and blotched with pale reddish brown, generally heaviest about the larger end; sometimes grayish or pinkish white, spotted with salmon and lavender.

GENERAL HABITS.—Although the Bendire Thrasher, as Mr. Henshaw says, is a shy bird of the mesquite and cactus in fall and winter, skulking from cactus to cactus and from one clump of bushes to another, Mr. Gilman finds that in summer it takes kindly to civilization, coming fearlessly into yards and, if not molested, nesting near houses, on which it perches to sing. Its song is said to be greatly varied, and Mr. Gilman thinks it excels that of all the other Thrashers.

CRISSAL THRASHER: *Toxostoma crissale* Henry

PLATE 60

DESCRIPTION.—*Length*: About 11.4–12.6 inches, wing 3.9–4.1, tail 4.8–6.4, bill 1.2–1.5, tarsus 1.3. *Bill long, sharply curved. Adults*: Upperparts dark grayish brown; wings without bars, tail faintly tipped with rufous; throat and malar stripe white, in contrast to dark fawn or grayish underparts; *under tail coverts dark rufous; iris brown or straw-color. Worn summer plumage more sandy than that of winter. Young*: Like adults but slightly paler below.

RANGE.—Breeds in Sonoran deserts from southeastern California, Arizona, New Mexico, and western Texas south to Chihuahua, Sonora, and Lower California.

STATE RECORDS.—The type specimen of the Crissal Thrasher was taken by Doctor Henry at Fort Thorn,¹ where it was found in December. [It is fairly common along the southern half of the Rio Grande. At Palomas Hot Springs, a nest was found May 24, 1916, with four well incubated eggs; and one, May 25, 1916, with three fresh eggs (Ligon).] It breeds at Mesilla Park (Merrill); Deming (Anthony); Silver City, 6,000 feet (Marsh); Big Hatchet Mountains, 4,800–5,500 feet (Goldman); at Dog Spring, 4,800 feet near the San Luis Mountains (Mearns); and at Carlisle, 5,000 feet (Barrell).

In the fall it was noted September 15–23, 1908, in Swan Canyon of the Burro Mountains; and was found rather common September 6–8, 1908, along the base of the Florida Mountains and up to 5,100 feet; was taken November 14, 1909, at Lake Valley, 5,000 feet, and October 28, 1909, at Las Palomas, 4,200 feet (Goldman); also November 8, 1902, at Tularosa, 4,400 feet (Gaut); and was seen November 5–6, 1906, at Cactus Flat (Bailey).

The species winters regularly at Mesilla Park (Merrill), and either winters at Silver City or migrates very early, for it was seen there continuously in 1884, after February 9 (Marsh). [Specimens were taken on December 12, 1916, in Dona Ana County (Kellogg).] In brush lands bordering the Carlsbad Bird Reserve, it was noted during the winter of 1915–1916 [common in December, 1916 (Willett)].—W. W. COOKE.

NEST.—In mesquites, tornillos, and bushes, as "squaw-berry" and greasewood; rather shallow, made of twigs and usually lined with fine rootlets, but sometimes horsehair, feathers, grass or bark. *Eggs*: 2 to 4, plain bluish green.

¹ Henry, T. C., Proc. Acad. Nat. Sci. Philadelphia, vol. 10, 117–118, 1858.

GENERAL HABITS.—Among the grotesque forms of tree cactus and tree yucca on Cactus Flat at the foot of the Mogollons, November 5, 1906, we were delighted to catch sight of the large dark Crissal Thrashers with their long, sharply curved bills, flying swiftly away to cover.



MAP 50. CRISSAL THRASHER

Shaded areas show general range. Triangles mark breeding and yearlong records

They were rather common early in September, 1908, on the western basal slopes of the Florida mountains, Major Goldman reports, "ranging up over the hot slopes along with *Yucca radiosa* and other Lower Sonoran plants to about 5,100 feet" (MS).

In the early days, Mr. Henshaw found that they inhabited by preference "the rough sides of rocky canyons or the hillsides covered with broken débris, interspersed with straggling bushes" (1875, p. 158).

From Mesilla Park, Professor Merrill wrote later: "The Crissal Thrasher is most numerous in the creosote belt and in the wide arroyos where the mimbres grow more profusely, but it is found nesting in bushes in the foothills and in the valley among mesquites and tornillos. In winter it is more numerous in the lower levels. By the first of July the young are fully fledged and in early morning on the mesa one can see whole families disporting themselves together, running and flying after each other, singing and calling and feeding between times. The song is rich and full but not greatly varied nor very loud. Early morning in summer and a warm midday in winter will occasion bursts of song. This bird often sings from the ground instead of always perching on top of a bush. Gizzards of some summer specimens showed quantities of ants with bits of some vegetation" (MS).

The Crissal is such a close sitter that Mr. Gilman has been able to approach a brooding bird near enough to see "the extremely curved bill and straw-colored eyes" (1909a, p. 52). Its flight is bobbing and jerky. Its call notes "*queety-queety*" and a scolding "*cha*," are sometimes heard from the mesquite, and, when tempted by water, the thicket-loving bird may come to drink with the chickens and dig in the garden, the strong pickaxe bill and large feet characteristic of the Thrashers making effective implements.

SAGE THRASHER: *Oreoscoptes montanus* (J. K. Townsend)

PLATE 61

DESCRIPTION.—*Length*: 8-9 inches, wing 3.9-4.3, tail 3.2-3.3, bill .6, tarsus 1.1. Bill much shorter than head, wings and tail of equal length, *tail graduated*. *Adults*: *Underparts dull grayish brown*, feathers with obsoletely darker centers; *wings and tail blackish*, tail with inner web of two to four *outer feathers tipped with white*, wings with two narrow white bars; *underparts whitish*, more or less tinged with pale buffy brown, breast and sides streaked; iris lemon yellow, legs and feet olivaceous, soles yellowish. *Young in juvenal plumage*: Upperparts as well as underparts streaked, ground color of upperparts browner than in adults.

RANGE.—Breeds on arid sagebrush plains and foothills in Transition and Upper Sonoran Zones from southern British Columbia, prairie regions of Montana, and western Nebraska south to northern New Mexico and eastern California; winters from southern California, southern Arizona, and central Texas to Tamaulipas, Chihuahua, Cape San Lucas, and (casually) Guadalupe Island.

STATE RECORDS.—The breeding records of the Sage Thrasher in New Mexico come from the northwestern part of the State where it breeds at Shiprock (Gilman); at Fort Wingate (Henshaw); and at Lake Burford, July, 1913 (Ligon). [A nest with half grown young was found, May 30, 1922, on the Pinyon Flats three miles south of the Santa Fe Indian School. Two additional pairs were seen near by (Jensen). It was common and singing about Tres Piedras in May, and breeds as far south as Grant—west side of Mount Taylor, where a tongue of sage reaches down (Ligon, 1916-1918).] It was seen July 10, 1904, near Taos, and one was taken on the mesa near Albuquerque the middle of July, 1889 (Bailey); both of which records probably indicate breeding birds, though the species is not a common breeder anywhere in



From Biological Survey

THE WELL-NAMED SAGE THRASHER

New Mexico. Its breeding range is from 5,000–7,500 feet. Eggs just ready to hatch were taken at Fort Wingate, July 14, 1873 (Henshaw). It was fairly common near Koehler Junction, July 28–October 24, 1913, especially along the borders of the foothills (Kalmbach).

It migrates so early that by August 6, 1901, it was already present at Carlsbad, far south of its breeding range (Fuertes). It is a common migrant below 7,000 feet, but usually does not appear in numbers until the latter part of August; Encino, 50 miles southwest of Santa Rosa, August 19–26, 1911 (Dearborn); near Santa Clara Canyon, August 20, 1906, and Ribera, August 27, 1903 (Bailey); the valley west of the Guadalupe Mountains, September 3, 1902 (Hollister); and Apache about September 1 (Anthony). It was seen at Fort Bayard September 17, 1914 (Rockhill), and at Chloride September 20, 1915 (Ligon). It is common through October, but most leave the State in November. [A great flight was seen at Tularosa October 14, 1917 (Ligon).] Some of the later records are: Chama River, October 15, 1904 (Bailey); Corona, October 10–20, 1902 (Gaut); Cuchillo, October 22–23, 1909 (Goldman); Cactus Flat, November 5–6, 1906 (Bailey); Zuni, November 26, 1853 (Kennerly); and Deming, November 29–30, 1889 (Bailey).

A few winter in the State—at Mesilla Park, January 19, 1903 (Ford); Silver City (Hunn); and one was taken January 27, 1854, at Fort Webster (Henry).

The first spring migrants appeared at Apache, February 28, 1886 (Anthony); Silver City, March 22, 1884 (Marsh); on the boundary line 60 miles west of the Rio Grande, March 25, 1892 (Mearns); at Albuquerque April 3, 1901 (Birtwell); and at Rinconada April 19, 1904 (Surber). [At Lake Burford the first was seen May 29, 1918, but afterwards it became fairly common (Wetmore).]—W. W. COOKE.

NEST.—On ground or in low bushes, especially sagebrush; bulky, made largely of coarse plant stems, twigs of sagebrush and greasewood, dry sage shreds and sage bark; lined with fine rootlets and sometimes hair and fur. *Eggs*: Usually 4, rich greenish blue, spotted with clove-brown.

FOOD.—Buffalo and other berries, seeds, fruit, hard shelled beetles, locusts, ants, small wasps, alfalfa weevils, other insects, and by one record, 62 per cent of grasshoppers.

GENERAL HABITS.—The grayish brown Sage Thrasher, next to the Sage Grouse the largest of the characteristic birds of the sagebrush country, may be seen perching on boulders or running over the ground. Near the mouth of Santa Clara Canyon, to our surprise and pleasure, we discovered five of the interesting birds grouped around a tree cactus, and as they flew they showed their diagnostic white-cornered blackish tails. Near Ribera, we saw two of them, with tails characteristically perked up in wren-like style, hopping about under a tree. One secured on August 27, 1903, showed its yellow iris and was already in beautiful fresh fall plumage.

Near Laguna, on September 16, we were greatly pleased to have a large animated flock of migrating birds come into the junipers near camp. Their harsh nasal *chuck* was frequently heard as they chased one another playfully about among the trees. In migrating, Mr. Gilman says, at times their average speed appears to be only about a mile a day.

In habits and song, the Sage Thrasher seems to combine the characters of its near relatives, the Mockingbirds and Thrashers, and it might well be called the Mockingbird of the Sagebrush. On the sagebrush plain, Mr. Henshaw tells us, "from the top of some low bush, its beautiful, low, warbling song comes, often the only sound



MAP 51. SAGE THRASHER
Triangles mark breeding and breeding season records

which breaks the quiet of the desolate plain" (1875, p. 150). It sings late in the fall. Several seen by Mr. Bailey at Deming the last of November were singing in an undertone, as he had previously heard them in the Wasatch Mountains, when over a foot of snow lay on the ground.

In the region of Mesilla Park, Professor Merrill writes, "the Sage Thrasher breeds mainly in the foothills and the mountain region from

5,000 to 6,000 feet, but after the breeding season it is found more often on the mesa and is quite common in the valley near Mesilla Park, in the winter. On the mesa it is wild and hard to approach and in its rock-strewn breeding haunts seems always in the act of just disappearing. In winter it is not so wild in the valley and I have had it run along in front of me some distance before fluttering aside into the bushes. For tenderness, richness of melody, and genuineness its song surpasses the Mockingbird's (MS).

ADDITIONAL LITERATURE.—GILMAN, M. F., *Condor*, IX, 42-44, 1907.—RUST, H. J., *Condor*, XIX, 35, 1917 (nest).—TAYLOR, W. P., *Field Notes on Amphibians, Reptiles, and Birds of Northern Humboldt County, Nevada*, Univ. of Calif. Pub. in Zool., Vol. 7, No. 10, pp. 413-416, Feb. 14, 1912.

THRUSHES, SOLITAIRES, BLUEBIRDS, etc.: Family Turdidae

In the North American forms of Turdidae the bill is usually slender, the wing, over three inches long, is more or less pointed, and longer than the tail, with ten primaries, the first of which is spurious or short; while the *tarsus is booted*, its anterior plates, except a few below, being fused in a continuous plate; and the young have a spotted breast (Coues).

REFERENCES.—BEAL, F. E. L., U. S. Dept. Agr. Bull. 171, 1915; U. S. Dept. Agr. Bull. 280, 1915.

WESTERN ROBIN: *Turdus migratorius propinquus* Mearns

DESCRIPTION.—*Length*: 10-11 inches, wing 5.2-5.7, tail 3.8-4.7, bill .8-.9, tarsus 1.2-1.4. *Adult male in spring and summer*: Head, wings, and tail blackish (lores and eyelids marked with white), wings and tail with grayish edgings; rest of upperparts of olivaceous gray, abruptly defined against black of head; chin white, throat black, streaked with white; rest of underparts cinnamon-rufous, fading to white on lower belly and under tail coverts; bill yellow, upper mandible with dusky tip. *Adult male in fall and winter*: Similar, but upperparts more tinged with olive brown, underparts with feathers tipped with white; bill blackish, horn color below. *Adult female*: Similar to male but usually duller, blackish feathers of head margined with grayish; underparts paler with white margins to feathers, partly persistent in summer. *Young*: Upperparts streaked with white or buffy; underparts spotted.

RANGE.—Breeds mainly in Canadian and Transition Zones from southern British Columbia, southern Montana, and Black Hills south to northern Mexico and southern California; winters from southern British Columbia and Wyoming south to highlands of Guatemala.

STATE RECORDS.—The Western Robin has quite a wide range in the mountains of central and western New Mexico, where it breeds east to Cloudercroft, 9,000 feet (Bailey); Capitan Mountains, southeast slope (Gaut); Anton Chico, 5,500 feet (Ligon); Ribera, 6,000 feet (Bailey). [The Robin and the Gray-headed Junco are the commonest birds of the Sangre de Cristo Mountains (Ligon, 1919). On June 26, 1922, a completed nest was found at 12,000 feet on Lake Peak (Jensen). It also nests freely in Albuquerque about 5,000 feet (Ligon, 1916-1918).] Its breeding range extends south to the Organ Mountains, 6,500 feet (Merrill); Fort Webster

(Henry); Pinos Altos Mountains (Fisher); and Cooney (Barrell). These altitudes represent about the lowest at which the species breeds commonly in New Mexico, though young out of the nest were found June 11, 1913, at Palomas Spring, 4,200 feet, and were common at 5,000 feet on the Penasco, June 20, 1913 (Ligon). At



From Biological Survey

FIG. 98. Robin (*Turulus migratorius migratorius*)

A hard-working parent

the other extreme, a nest with eggs was found July 23, 1903, in the mountains of the Upper Pecos at 11,000 feet, and the birds were seen to 11,600 feet at the foot of Pecos Baldy (Bailey); [young were seen July 18, 1919, at timberline about 12,600 feet on Truchas Peak (Ligon)]. The breeding season is long extended; nesting was recorded the middle of May, 1906, at 6,500 feet on the Mimbres (Bailey); and a nest with eggs was found May 18, 1913, near Chloride (Ligon); while three months later a nest still containing young was noted August 20, 1903, at 8,000 feet on the Pecos (Bailey). Fresh eggs are found in northern Santa Fe County, April 20–July 10 (Jensen).

After the breeding season, in the mountains above Taos, they were seen late in July, 1904, from 7,400 feet to above timberline at 12,700 feet (Bailey). At Apache,

where the species does not breed, the first fall arrival was noted August 7, 1886 (Anthony); at this season it migrates at least as far east as Oak Canyon, September 3, 1903 (Howell). Along the Red and Cimarron Rivers, in Colfax County, they were frequently seen between July 28 and October 24, 1913 (Kalmbach); at Clapham, one was seen November 5, 1893 (Seton).

They remain in New Mexico during the winter and at this season a few descend into the low valleys; [they were abundant on the Rio Grande Bird Reserve November 23–December 9, 1916 (Willett)]; were seen at 3,800 feet at Mesilla (Ford); and 4,000 feet in the valley of the Gila (Stephens); one was noted December 25, 1902, at Albuquerque (Harman); but the larger part of the individuals remain through the winter in the mountains or the higher valleys even in northern New Mexico. They were abundant locally in Union County, November 5, 1915 (Ligon); at Currumpa in January, 1894, flocks being seen on January 9 and 15, of at least 100, and January 21, over 200 (Seton). Even as late as early December, in 1903, they were still common at 11,000 feet in the mountains near Twining, and were common all winter in the Hondo Canyon, 8,000 feet (Surber); also along the Rio Grande at Espanola, 5,800 feet (Loring).—W. W. COOKE.

NEST.—In treeless regions, on the ground; in timber, usually near ground; compact and bulky, made of twigs, leaves, stems, and grasses, plastered together with mud, and lined with fine stems and rootlets. *Eggs:* Usually 4, greenish blue.

FOOD.—Vegetable food forms about 58 per cent, over 42 per cent being wild fruits and only a little more than 8 per cent being possibly cultivated varieties [cedar berries eaten in Colorado and New Mexico (Henderson)]. Except in the case of olives which, in years when the native wild fruits fail, are resorted to, the depredations of the Robin seem confined to the smaller, earlier fruits which ripen before the wild fruits, so that the loss can be prevented by planting the Russian

mulberry, which ripens earlier. "The birds' general usefulness is such that all reasonable means of protecting orchard fruit should be tried before killing them" (Henshaw). Noxious insects comprise more than one-third of the Robin's food including grasshoppers, cutworms (one stomach contained 192 small cutworms) and other caterpillars, bugs, codling moth larvae, and alfalfa weevils. In alfalfa regions in Utah, the Robin spends much of its time in spring about the borders of alfalfa fields, where the weevils are emerging from winter quarters. In April 14.29 per cent of the food was alfalfa weevils, and in June, 23.77 per cent. In April one Robin had eaten 56 weevils, and in June one destroyed 2 adults and 253 larvae, and another 3 adults and about 241 larvae. "Until the weevil is reduced in numbers the services of the Robin as a destroyer of breeding adults alone ought to earn for it the utmost protection" (Kalmbach).

GENERAL HABITS.—The Robin, which in the East is a familiar and beloved bird of the dooryard, in its western form in New Mexico is found largely in the mountains, although a nest was seen in Santa Fe and it nests freely in Albuquerque, where its cheery song and friendly ways can be enjoyed to the full. When seen only in passing, however, as it is by the field worker in the mountains, it is still a pleasure to meet it.

In 1903, we were fortunate enough to find it at various points from Pecos to the foot of Pecos Baldy, from 7,000 to 11,600 feet. At 8,000 feet, on July 15, we found young being fed out of the nest, and the next day a pair just about finishing a nest, while three thousand feet higher, a week later we found a nest with eggs. At 11,600 feet, on August 16, we saw an old bird that had molted its tail, unless, as sometimes happens, it had had a narrow escape.

In 1904, at timberline on Wheeler Peak, Robins were seen on July 24 in the timber and hopping over the wide grassy slopes; also in the creek basin at 12,700 feet, with those birds of the highlands, the Pipits. On the mesa above Hondo Canyon, August 12, we saw a number of Robins, some of them eating chokecherries. On August 18, a flock was seen in the tree tops at La Belle, at about 10,000 feet. On September 26, on the Chama River, they were seen in the junipers, presumably eating the ripe juniper berries. On October 1, at the Burford Lakes, a large flock came into the cottonwoods close to our camp.

In 1906, as we journeyed along, in Valle Santa Rosa two were seen on September 7. In Largo Canyon, October 2 and 3, only a few were heard, but on the morning of October 4, in the cottonwoods of the canyon, there was a beautiful sunrise chorus that sounded like spring, and apparently came from birds that had arrived in the night. The following night there was a severe frost—ice formed on the water pails after they were filled at daylight—there was no chorus, and apparently few Robins were left. On October 8, some were noted in the yellow pines at about 8,000 feet, a few miles north of Gallo Spring;

on October 11, four were seen eating *Forsteria* berries, a few miles north of Reserve; on October 14, others were found in the San Francisco canyon, where there were wild grapes and an abundance and great variety of winter bird food. Quite a number were seen from 8,500 to 9,000 feet in the Mogollon Mountains before a two days' snowstorm—October 21 and 22—and others were seen between October 27 and 30 at the same altitudes after the weather had cleared and moderated. On our way out of the mountains, on October 31, we saw them at 7,200 feet on the south side of the Mogollon grade. In 1908, late in October, several were seen by Mr. Bailey at San Rafael, along the edge of the junipers, where they were probably feasting on the ripe, sweet berries of the soft-leaved cedar, *Juniperus scopulorum*.

At Fruitland, where Mr. Birdseye found them very common, October 15–November 4, 1908, they were seen in apple orchards, where they were apparently eating the dried and rotten fruit. Although he was told that they did a little damage to cherries and berries in their season, only a comparatively small quantity of the fruit was raised there. In the same year, Major Goldman saw a number of Robins at 6,500 feet in the Burro Mountains late in September, feeding on wild cherries, wild grapes, and the ripening fruit of the woodbine. Near Twining, late in the fall, Mr. Surber found the birds common, ranging from 11,000 feet to timberline. Here the storms apparently did not affect the hardy Robins, for they did not move up and down the mountains with changes in weather.

In 1909, Major Goldman found them one of the more abundant birds of the middle parts of the Zuni Mountains, a few being seen on the higher slopes. "One shot in a meadow the middle of June, 1909, had its stomach filled with fragments of grasshoppers and held one, just caught, in its bill. Several were seen in the higher part of the San Mateo Mountains and one or more were noted nearly every day in the pinyon belt. On September 22, one in the pinyon belt was observed pecking at a black caterpillar, of a species that was abundant in places on trunks of pinyon trees and on small shrubs and herbaceous vegetation, and that was eating the leaves of *Lycium torreyi*. On being shot, the bird's stomach was found entirely filled with these black caterpillars.

In the Organ Mountains, Professor Merrill reports, the Robins are resident, breeding at 6,500 feet and higher, in July. In winter they congregate in the canyons at lower altitudes, and occasionally though rarely one gets into the valley.

The history of the seasonal movements of the Western Robin given by Grinnell and Storer is an interesting one. After the young are grown, family parties are to be seen for a while but "as soon as the young are capable of getting their living independently, they gather

into flocks. Meanwhile the adults go off by themselves and remain sequestered until completion of their annual molt. Then, in late September, the Robins, without regard to sex or age, gather into mixed flocks and, for the most part, spend the winter in such gatherings" (1924, p. 607). One such gathering recorded by Mr. Ernest D. Claibough, at Berkeley, California, totaled about seven hundred birds, roosting at night in two places under observation (1928, p. 126).

When the Western Robin deserts the mountains to nest in town it now finds itself face to face with the aggressive English Sparrow. A remarkable case of aggression is given by Mr. Jensen in the *Auk*, under date of July 1, 1925. He says: "During the latter half of May, 1925, a pair of Robins built a nest in a locust tree in front of my house. Four eggs were laid and in due season four young appeared. The parent birds have since been busy feeding the young. A pair of English Sparrows discovered the Robin's nest and saw the process of feeding. Now for about two weeks the Sparrows have been watching the Robins closely, and whenever one of these fly down on the lawn in search of food for the young, the Sparrows will follow it. As soon as the Robin captures a grasshopper or a worm and flies to the nest, the Sparrow will follow and alight on the rim opposite the Robin. As soon as the Robin has placed the food in the open bill of one of the youngsters, one of the Sparrows reaches over and pulls the food out and flies away to a quiet place to devour it.

"The young Robins do not seem to suffer from lack of food, so I imagine the parents may have to work harder to offset the robberies of the Sparrows" (1925c, p. 591).

An interesting case of nestling Western Robins being fed by a Russet-backed Thrush is recorded by Stanley G. Jewett, under the caption, "Assistant Parentage among Birds." Twelve times in four hours, the Thrush was seen feeding its neighbor's nestlings (1928, p. 128). One wonders if it had lost its own little brood.

In the Southeast, where it has sometimes been difficult to stop the market trade in Robins and other small birds, a technical character once saved the day. It was in Washington, and a member of the Biological Survey was called down to the famous "Center Market" to examine hanging bundles of small plucked birds, which the dealer was sure no one could identify. In his ignorance, however, he had left on the legs, and one look of the professional at the "tarsus" settled the question—it was "booted"—the outstanding character of the family of Thrushes to which the Robin belongs, and common to no other birds of similar size, the Robin, moreover, the only member of the family used for market purposes. The dealer was convicted and fined, and the Judge in pronouncing his sentence remarked that he

was sorry he could not double the penalty. As a result the trade was broken up in Washington—quite a triumph for the “booted tarsus”!

ADDITIONAL LITERATURE.—BEAL, F. E. L., U. S. Dept. Agr. Bull. 171, 1915.—BREWSTER, WILLIAM, Auk, VII, 360-373, 1890 (roost).—HERRICK, F. H., Home Life of Wild Birds, 36-51, 97, 113-114, 1901.—MILLER, O. T., A Bird Lover in the West, 250-254, 1894.—PEARSON, T. G., Educational Leaflet 46, Nat. Assoc. Audubon Soc.—SALMON, M. B., Bird-Lore, XXVII, pp. 98-99, 2 photos, 1924 (raising young).

NORTHERN VARIED THRUSH: *Ixóreus naévius meruloides* (Swainson)

DESCRIPTION.—(Type, ♀): Wing 5.1, tail 3.8, tarsus 1.3, bill .8. *Adult male:* Head, sides of neck, and a broken necklace across breast, black; the black of cheeks outlined from upper eyelid down, by curving tawny stripe; back blackish gray, tail grayish black with lateral feathers having *white spot at tip*; wings dusky, with grayish edgings, and *two tawny wing bars*, the quills marked basally and near tips with brownish buff; *throat and breast tawny* or brownish buff, with a *blackish necklace*; belly more or less white, sides like breast but paler; bill black, base of under mandible pale yellow; legs and feet flesh color. (In winter usually with feathers of upperparts edged with olive.) *Adult female:* Coloration much duller, chest band more or less indistinct.

RANGE.—Breeds in Hudsonian and Upper Canadian Zones from the Yukon and Mackenzie Deltas south to the southern part of Mackenzie Valley and Prince William Sound and in mountains through eastern British Columbia to northwestern Montana and northeastern Oregon; winters mainly in interior and southern parts of California south to San Diego County. Reported from Lower California in November, and from Colorado and New Mexico in winter.

STATE RECORDS.—On the Rio Grande Bird Reserve a Northern Varied Thrush was seen December 1, 1916, by George Willett.

ADDITIONAL LITERATURE.—BAILEY, F. M., Condor, XIX, 101, 1917.—FINLEY, W. L., Educational Leaflet 115, Nat. Assoc. Audubon Soc.—MAILLIARD, JOSEPH, Condor, X, 118-119, 1908.—SILLOWAY, P. M., Condor, VII, 19-21, 1905.

WILLOW THRUSH: *Hylocichla fuscescens salicicola* Ridgway

DESCRIPTION.—*Length:* About 6.9-7.9 inches, wing 3.8-4.2, tail 2.9-3.4, bill .5-.6, tarsus 1.1-1.2. *Adults:* Upperparts uniform olive-brown without eye-ring, chin and throat buffy white, chest pale buffy, lightly spotted with triangular brown spots; median underparts white, sides washed with gray. *Young:* Upperparts spotted, underparts barred or spotted.

COMPARISONS.—Representatives of three forms of the genus *Hylocichla* are found in New Mexico. The Willow Thrush is without eye-ring and with uniformly colored upperparts; the Russet-backed and Hermit Thrushes have a white or buffy eye-ring. Of these the Russet-backed has tawny cheeks, and the tail browner than back; while the Hermit Thrushes of various forms have browner cheeks, and the tail more or less reddish brown in contrast to back. (See pp. 569, 570-573.)

RANGE.—Breeds in Lower Canadian and Transition Zones from southern British Columbia, central Alberta, central Saskatchewan, and southern Manitoba south to central Iowa, northern New Mexico, Utah, Nevada, and central Oregon; winters in South America to Brazil. Recorded from Arizona.

STATE RECORDS.—No specimens of the Willow Thrush have been taken in New Mexico, and there are only two records for the State, both from warmer localities than those regularly selected for its breeding range. At El Rito, 5,500

feet, Judge Junius Henderson reported seeing a pair August 5, 1910, which he was told had raised a brood there that season; and in the willows at the mouth of Pueblo Creek, about 7,000 feet, July 17, 1904, the Baileys heard what they took to be *salicicola* singing. The species occurs regularly though rarely in Colorado, and the Colorado birds must pass in migration through New Mexico.—W. W. COOKE.

NEST.—On or near the ground, made largely of leaves. Eggs: 4, greenish blue, very rarely with a few specks of brown.

GENERAL HABITS.—In Montana, the Willow Thrush keeps near water in thickets of willow, rose, or box-elder. Its notes are said to be the same as those of the eastern Veery, whose call is a rather plaintive *whew-you*, and whose song is described as a series of silver rings, or as Doctor Chapman gives it, "the syllables *vee-r-r-hu* repeated eight or nine times around a series of intertwining circles" (Handbook).

RUSSET-BACKED THRUSH: *Hylocichla ustulata ustulata* (Nuttall)

DESCRIPTION.—Length: 6.9–7.6 inches, wing 3.6–4, tail 2.8–3.3, bill .5–.6, tarsus 1.1–1.2. Adults in spring and summer: Upperparts olive-brown, wings and tail browner than back; buffy eye-ring distinct, sides of head tinged with tawny, throat and chest buff, chest with triangular olive-brown marks; lower underparts white, sides pale brown. Adults in fall and winter: Similar but more deeply or brighter colored, upperparts from olive-brown to russet brown; underparts more buffy. Young: Upperparts olive-brown, largely streaked or spotted with buff or tawny; wings with two buffy or tawny bars, underparts like adults, but markings generally distinctly transverse, sides and flanks, at least, barred with black.

RANGE.—Breeds in Canadian and Transition Zones from Juneau, Alaska, to San Diego County, California; winters from Vera Cruz, Guatemala, and Costa Rica to eastern Ecuador and British Guiana. Migrates through western Arizona. Recorded from New Mexico and Missouri.

STATE RECORDS.—It would be supposed that the Olive-backed Thrush (*Hylocichla ustulata swainsoni*)¹ would be the form of New Mexico, but the only specimen available proves to be the Russet-backed. It was taken May 3, 1892, along the southern boundary of the State, 100 miles west of the Rio Grande. It was, of course, a migrant on the way to its breeding grounds far to the northwest.

It is probable that the Olive-backed will eventually be found in northern or northeastern New Mexico. It is a fairly common breeder in northern Colorado and a common migrant as far south as the Arkansas Valley. It was common in May, 1905, at Springfield, Baca County, only a few miles from the New Mexico line, and one was seen June 6, 1907, near Vallecito, Colorado (Cary), which was probably nesting in that neighborhood and which had undoubtedly crossed New Mexico to reach its breeding grounds.

In the report of the collections made in the Pecos mountains the statement is made that the Olive-backed Thrush was fairly common after its arrival September 13, 1883 (Henshaw). Some mistake has undoubtedly been made in copying this record, for there was no specimen of the Olive-backed Thrush taken that year on the Pecos and the thrush that was obtained September 13 was the Rocky Mountain Hermit Thrush.—W. W. COOKE.

ADDITIONAL LITERATURE.—BAILEY, F. M., Condor, XIX, 48, 1917.

¹ The Olive-backed Thrush, while it has the buffy eye-ring and cheeks of the Russet-backed, has the back and tail uniform in color.

ALASKA HERMIT THRUSH: *Hylocichla guttata guttata* (Pallas)

DESCRIPTION.—Adult male: Length (skins) 5.5-6.5 inches, wing 3.4-3.5, tail 2.4-2.7; bill .4-.5, tarsus 1.1-1.2. Female slightly smaller. *Adults:* Upperparts dark grayish-brown, more olive-brown in winter, tail cinnamon-brown, more reddish-brown in winter; eye-ring white, conspicuous; underparts white, lower throat with



From Biological Survey

FIG. 99. Russet-backed Thrush

narrow wedge-shaped streaks, chest thickly marked with large spots; sides brownish gray; bill dusky, flesh-colored at base. *Young:* Upperparts streaked with buffy; breast, upper belly, and sides barred with black or dusky.

COMPARISONS.—The Alaska Hermit Thrush can be distinguished from the Audubon by its smaller size and darker coloration. But the identification of the various hermit thrushes is a matter of comparative measurements and shades of color, so that, before collectors make definite records of specimens, they should send them to a museum or to the Biological Survey for comparison with series of skins.

RANGE.—Breeds mainly in Hudsonian Zone from Mount McKinley, Alaska, south to Kadiak Island, Cross Sound, and northern British Columbia (east of coast ranges); winters in southern Arizona and south to Tamaulipas, Nuevo Leon, Chihua-

hua, Sonora, and Lower California; in migration east to eastern Oregon, Nevada, Arizona, New Mexico, and Texas.

STATE RECORDS.—Four forms of the Hermit Thrush occur in New Mexico; only one of them, *Hylocichla guttata auduboni*, breeding in the State, while the others, *H. g. guttata*, *H. g. nana*, and *H. g. sequoiensis*, come as migrants or as winter residents. The Alaska Hermit Thrush, *H. g. guttata*, as its name implies, breeds mainly in Alaska, though it winters south to northern Mexico. During migration a few pass through New Mexico, where one was taken October 12, 1883, near Willis (Henshaw); another on October 10, 1908, was taken in the Chuska Mountains 8,800 feet (Birdseye); one October 19, 1906, in the Mogollon Mountains, 8,500 feet (Bailey); others in the Powder Horn Canyon of the Mimbres River, October 6, 1908. (Bergtold); and the San Luis Mountains September 29, 1893 (Mearns).—W. W. COOKE.

AUDUBON HERMIT THRUSH: *Hylocichla guttata auduboni* (Baird)

DESCRIPTION.—*Length*: 7.5–8.2 inches, wing 3.6–4.3, tail 2.9–3.4, bill .5–.6. *Adults in spring and summer*: Upperparts light grayish brown, rump, upper tail coverts and tail fulvous, in decided contrast to back; underparts white, shaded with grayish olive on sides, throat immaculate but breast tinged with buffy and marked with numerous large dusky spots; orbital ring buffy. *Adults in fall and winter*: Colors stronger, olivaceous of upperparts more reddish brown (back still strongly contrasting with tail), buffy wash of underparts more pronounced. *Young*: Upperparts largely marked with buffy, clubbed streaks, underparts spotted and more or less barred.

COMPARISONS.—The Audubon Hermit Thrush can be distinguished from the other Hermit Thrushes by its larger size.

RANGE.—Breeds in Canadian and Upper Transition Zones from British Columbia and Montana south to New Mexico and Arizona; winters in western and central Texas and south over Mexican tableland to Guatemala.

STATE RECORDS.—The higher parts of the New Mexico mountains are occupied in summer by the Audubon Hermit Thrush. It was common from 11,000 to 11,600 feet at the foot of Pecos Baldy, young being out of the nest July 23, 1903; and it was still common at 11,600 feet the middle of August. The next year it was common July 19–August 8 at 10,700 feet in the mountains north of Taos (Bailey). These altitudes mark the upper limit of the breeding range. It breeds commonly at 9,000 feet on Mount Sedgwick in the Zuni Mountains (Goldman); at Cloudercroft, 9,000 feet (Green); [was taken June 28, 1919, 40 miles northeast of Santa Fe at 8,500 feet (Ligon); and was common in the Sangre de Cristo Mountains from 7,500 feet to timberline; fresh eggs being found June 10–July 1 (Jensen, 1922)]; breeding down to 8,000 feet in the yellow pine belt of the San Mateo Mountains (Hollister); in the Capitan Mountains, July 10, 1902 (Gaut); the Chuska Mountains (Gilman); at Willis, 7,800 feet, June 3, 1901 (Birtwell); on Pueblo Creek 7,000 feet, near Taos, July 11, 1904 (Bailey). Thus its breeding range extends from about 7,000 to 12,000 feet, but it nests most commonly at 9,000–11,000 feet. [One was taken and several observed May 8, 1920, at the north end of the Animas Mountains; two nests were found in the Black Range, in canyon beds, one with young 8 miles southwest of Chloride, at 6,800 feet, June 25, 1920, and one with eggs in Circle Seven Canyon, 16 miles south of Chloride, at 7,000 feet, July 6, 1920 (Ligon).]

Apparently all the summer birds of this form go south of New Mexico for the winter. The latest dates on which it was certainly identified were September 10, 1909, at 9,000 feet in Monica Canyon of the San Mateo Mountains (Goldman); and

September 13, 1883, near Willis (Henshaw); but it is probable that many individuals do not leave the State until October, or even later.—W. W. COOKE.

NEST.—In bushes or low trees usually in pine or spruce, but also in oak saplings, 3 to 10 feet from the ground; bulky, made almost wholly of bark and coarse grasses, outside covered with moss. *Eggs*: 4 or 5, light greenish blue, normally unspotted.

FOOD.—Vegetable 35.49 per cent, composed largely of wild or waste fruit, including pokeberry, service berry, holly, black alder, woodbine, elderberries, and mistletoe, and seeds of poison oak and weeds. Animal, 64.51 per cent, including ants, caterpillars, harmful beetles, among them many weevils; other insects and some spiders. "The Hermit Thrush destroys nothing indirectly helpful to man, as beneficial insects, but aids in the destruction of the myriad hosts of insect life which at all times threaten vegetation" (Beal).

GENERAL HABITS.—The Hermit Thrushes of whatever form may be recognized by the warm reddish brown of their tails in contrast to the brown of the back, together with their habit of slowly raising and lowering their tails and giving a low *chuck*, a habit that is helpfully directive in the dark forest. For, true to their name, the shy, solitary Hermits are found in the seclusion of dense forests. In the Capitan Mountains, Mr. Gaut found them in deep, dark canyons. In the higher Zuni Mountains, Major Goldman found them common, their beautiful song being frequently heard early in the morning and occasionally throughout the day. In the heavily forested amphitheater of Wheeler Peak, we found them singing and feeding young.

And at 11,000 feet, on Jack Creek below Pecos Baldy, we found them so surprisingly abundant in the dense spruce and fir forest that we named our camp Hylocichla Camp. From the woods above, below, and around us came their beautiful songs, the first heard in the morning and the last at night. At sunset, as we walked through the cool, still, spruce woods, its pale beads lit by the last slanting rays, involuntarily treading lightly to make no sound, from unseen choristers a serene uplifted chant arose, growing till it seemed to fill the remote aisles of the forest. Sometimes a silvery voice would come from the open edge of the dark forest, where the singer looked far down the mountainside and out over the wide mesa-clad plains—a wide view, the beauty and sweep of which seemed in rare harmony with his untroubled spirit.

ADDITIONAL LITERATURE.—MILLER, O. T., Little Brothers of the Air, 259-267, 1892.

DWARF HERMIT THRUSH: *Hylocichla guttata nanus* (Audubon)

DESCRIPTION.—*Wing*: 3.2 inches, tail 2.7, bill .5, tarsus 1.1. Like *N. g. guttata* but coloration darker and browner, anterior upperparts more sepia brown, upper tail coverts more russet, tail more chestnut, and spots on chest larger and darker.

RANGE.—Breeds in Canadian and Transition Zones from Cross Sound, Alaska, south to coast region of southern British Columbia; winters south to California, Arizona, and New Mexico.

STATE RECORDS.—Breeding along the coast from southern Alaska to southern British Columbia, a few individuals of the Dwarf Hermit Thrush come southeast in fall migration to winter in New Mexico. A specimen taken by Henry is in the National Museum marked "Mimbres to Rio Grande," and was probably taken near Fort Webster. In the spring one was taken on the southern boundary line 100 miles west of the Rio Grande May 5, 1892 (Mearns), and one at Shiprock, 5,000 feet, May 12, 1907 (Gilman).—W. W. COOKE.

SIERRA HERMIT THRUSH: *Hylocichla guttata sequoiensis* (Belding)

DESCRIPTION.—*Male*: Average length (skins) 6.1 inches, wing 3.6, tail 2.7. *Female*: Length (skins) 6.2 inches, wing 3.5, tail 2.6. Similar to *H. g. auduboni*, but decidedly smaller.

RANGE.—Breeds in Boreal Zones from southern Yukon to Sierra Nevada; south in migration and in winter to Lower California, western Mexico, and western Texas.

STATE RECORDS.—Along the high mountains from Yukon to southern California the Sierra Hermit Thrush makes its summer home. It follows, therefore, that those individuals which visit New Mexico in the fall have migrated more toward the east than toward the south. The earliest specimens come from the Burro Mountains September 16, 1908 (Goldman), where it was rather common from 6,500 feet to the summit. One was taken and several apparently of this subspecies were seen October 9, 1904, at 8,500-9,500 feet in the Gallinas Mountains (Bailey); one taken at 10,000 feet, above Twining, October 7, 1903 (Surber); and specimens taken October 13-15, 1903, on the east slope of the Manzano Mountains (Gaut).—W. W. COOKE.

ADDITIONAL LITERATURE.—RAY, M. S., Condor, XIV, 144, 1912 (nest).

[BLUEBIRD: *Sialia sialis sialis* (Linnaeus)]

DESCRIPTION.—*Length*: 5.7-7 inches, wing 3.9-4.1, tail 2.6-2.9, bill .6-.7, tarsus .7-.8. *Adult male*: Upperparts bright blue; underparts uniform cinnamon or reddish brown, fading to white on belly. (In winter, blue of upperparts slightly duller, more or less obscured by brownish tips to feathers.) *Adult female*: Upperparts bluish gray, deepening to bright blue on rump, wings, and tail; anterior and lateral underparts dull brown, becoming whitish on belly. *Young*: Upperparts dark gray, streaked with white; underparts white, chest and sides having streaked or scaled effect.

RANGE.—Breeds in Transition and Upper Austral Zones from southeastern Canada south to Florida, Gulf coast, and central Texas, casually west to Colorado, Wyoming, and Montana; winters most commonly south of Ohio Valley and Middle States.

STATE RECORDS.—The eastern Bluebird is not yet known from New Mexico, but it is so common in eastern Colorado, nesting at Holly and ranging regularly up the Arkansas to Pueblo, that it undoubtedly migrates through the northeastern corner of New Mexico. On the west a subspecies, the Azure Bluebird, *Sialia sialis fulva* Brewster, is found in the Santa Rita Mountains of Arizona not far from the southwestern part of New Mexico, but there is nothing known as yet to indicate that this form has ever been found ranging across the line.—W. W. COOKE.]

CHESTNUT-BACKED BLUEBIRD: *Sialia mexicana bairdi* Ridgway

PLATE 62

DESCRIPTION.—*Male* (type): Length (skin) 6.6, wing 4.3, tail 2.7, bill .4, tarsus .8. *Adult male in spring* (type): Upperparts dark purplish blue except for chestnut back and scapulars; chest band and sides chestnut, separating blue of throat from

that of rest of underparts, which fade to gray on belly. *Adult female in spring:* Back dull brown, rump, tail, and wings bluish, outer tail feather and outer primary edged with white; anterior underparts grayish or brownish, sometimes tinged with blue, cinnamon of breast tinging chest and throat. *Adult male in fall:* Similar to summer male but blue of head, neck, and chest obscured by brownish feather tips; chestnut of back and scapulars duller, with paler feather tips, that of chest with paler tips. *Adult female in fall and winter:* Similar to summer female but head and back decidedly bluish, and brown of underparts more chestnut. *Young:* Upperparts dark gray spotted with white, bluish on wings and tail; underparts grayish, feathers of breast squamated.

RANGE.—Breeds mainly in Transition Zone from Utah, Colorado, and western Texas south to Durango and Zacatecas; winters from southern Utah and southern Colorado south to Sonora and Zacatecas.

STATE RECORDS.—The Chestnut-backed Bluebird is an abundant breeder in the middle districts of the mountains of New Mexico, breeding throughout the western part of the State and east to Ribera, 6,000 feet, July 2, 1903 (Surber); base of Capitan Mountains, 6,200 feet, June 13-16, 1899 (Bailey); and probably in the Sacramento and the Guadalupe Mountains. There are no actual breeding records for these latter mountains, but the birds were seen there late in the summer—late in July and early in August—and it seems probable that they had not yet moved far from their nesting sites. It breeds south to the head of Mimbres River at 6,500 feet (Bailey); over all the Gila and Datil Reserves, at least as low as 6,500 feet, near Chloride (Ligon); in the Pinos Altos Mountains (Fisher); and also probably in the San Luis Mountains, as it was found there July 5, 1892 (Mearns). [In the north it is common in the northern part of Santa Fe County, 7,500 to 9,000 feet, fresh eggs being found May 20-June 20 (Jensen, 1922).] A nest with young was noted at Glorieta, 7,400 feet, about July 8, 1903; and birds were seen at 8,600 feet on July 15 and at 10,200 feet on July 21 (Bailey). It seems to breed most commonly at 6,500-8,000 feet. It breeds so early, nesting sometimes in March, that a mere record of presence during the summer is rather unsafe for use as indicating breeding. Even by June 18 in 1905, old and young had already gathered in flocks near Fort Wingate, 7,000 feet (Hollister); although at that time one pair was feeding a second brood; while by the middle of July flocks of old and fully grown young were as well established as during the fall. The date when these flocks begin to spread beyond their breeding range has not yet been determined.

The fall migration reaches its height in September and during this month the species is one of the most common at 7,000-9,000 feet in the mountains of northern and central New Mexico. At Aragon in the Tularosa Range it was also very abundant in 1915, migration being well under way by September 15 and continuing until October 7 (Ligon). It was seen as high as 10,500 feet September 4, 1906, on Santa Clara Mountain, and at 10,000 feet October 3, 1906, in the Pinyon Mountains (Bailey). It ranged east to Catskill the middle of September, 1903 (Howell); and by August 9, 1908, had already reached the Animas Mountains (Goldman). In the Sangre de Cristos it was seen at 8,000 feet on August 19, 1903, and was still present at Willis, 7,800 feet, October 10, 1883 (Henshaw); also at 10,200 feet in the Gallinas Mountains, October 7, 1904 (Bailey).

In winter it remains in New Mexico and comes into the lower part of the valleys, to Mesilla, 3,800 feet (Ford); [it was common on the Rio Grande Bird Reserve (Elephant Butte), November 23-December 9, 1916]; in the Guadalupe Mountains, January, 1915 (Willett); and to the Gila River, 4,000 feet (Stephens). It remains



SAY PHOEBE

CHESTNUT-BACKED BLUEBIRD

WESTERN BLUE GROSBEEK
FEMALE MALE

GREEN-BACKED GOLDFINCH

ARKANSAS GOLDFINCH
IMMATURE MALE

that of rest of underparts, which fade to gray on belly. *Adult female in spring:* Back dull brown, rump, tail, and wings bluish, outer tail feather and outer primary edged with white; anterior underparts grayish or brownish, sometimes tinged with blue, cinnamon of breast tinging chest and throat. *Adult male in fall:* Similar to summer male but blue of head, neck, and chest obscured by brownish feather tips; chestnut of back and scapulars duller, with paler feather tips, that of chest with paler tips. *Adult female in fall and winter:* Similar to summer female but head and back decidedly bluish, and brown of underparts more chestnut. *Young:* Upperparts dark gray spotted with white, bluish on wings and tail; underparts grayish, feathers of breast squamated.

RANGE.—Breeds mainly in Transition Zone from Utah, Colorado, and western Texas south to Durango and Zacatecas; winters from southern Utah and southern Colorado south to Sonora and Zacatecas.

STATE RECORDS.—The Chestnut-backed Bluebird is an abundant breeder in the middle districts of the mountains of New Mexico, breeding throughout the western part of the State and east to Ribera, 6,000 feet, July 2, 1903 (Surber); base of Capitan Mountains, 6,200 feet, June 13-16, 1899 (Bailey); and probably in the Sacramento and the Guadalupe Mountains. There are no actual breeding records for these latter mountains, but the birds were seen there late in the summer—late in July and early in August—and it seems probable that they had not yet moved far from their nesting sites. It breeds south to the head of Mimbres River at 6,500 feet (Bailey); over all the Gila and Datil Reserves, at least as low as 6,500 feet, near Chloride (Ligon); in the Pinos Altos Mountains (Fisher); and also probably in the San Luis Mountains, as it was found there July 5, 1892 (Mearns). [In the north it is common in the northern part of Santa Fe County, 7,500 to 9,000 feet, fresh eggs being found May 20-June 20 (Jensen, 1922).] A nest with young was noted at Glorieta, 7,400 feet, about July 8, 1903; and birds were seen at 8,600 feet on July 15 and at 10,200 feet on July 21 (Bailey). It seems to breed most commonly at 6,500-8,000 feet. It breeds so early, nesting sometimes in March, that a mere record of presence during the summer is rather unsafe for use as indicating breeding. Even by June 18 in 1905, old and young had already gathered in flocks near Fort Wingate, 7,000 feet (Hollister); although at that time one pair was feeding a second brood; while by the middle of July flocks of old and fully grown young were as well established as during the fall. The date when these flocks begin to spread beyond their breeding range has not yet been determined.

The fall migration reaches its height in September and during this month the species is one of the most common at 7,000-9,000 feet in the mountains of northern and central New Mexico. At Aragon in the Tularosa Range it was also very abundant in 1915, migration being well under way by September 15 and continuing until October 7 (Ligon). It was seen as high as 10,500 feet September 4, 1906, on Santa Clara Mountain, and at 10,000 feet October 3, 1906, in the Pinyon Mountains (Bailey). It ranged east to Catskill the middle of September, 1903 (Howell); and by August 9, 1908, had already reached the Animas Mountains (Goldman). In the Sangre de Cristos it was seen at 8,000 feet on August 19, 1903, and was still present at Willis, 7,800 feet, October 10, 1883 (Henshaw); also at 10,200 feet in the Gallinas Mountains, October 7, 1904 (Bailey).

In winter it remains in New Mexico and comes into the lower part of the valleys, to Mesilla, 3,800 feet (Ford); [it was common on the Rio Grande Bird Reserve (Elephant Butte), November 23-December 9, 1916]; in the Guadalupe Mountains, January, 1915 (Willett); and to the Gila River, 4,000 feet (Stephens). It remains



SAY PHOEBE

CHESTNUT-BACKED BLUEBIRD

WESTERN BLUE GROSBEAK
FEMALE MALE

GREEN-BACKED GOLDFINCH

ARKANSAS GOLDFINCH
IMMATURE MALE

through the winter at Las Vegas, 6,400 feet (Mitchell); and near Albuquerque (Birtwell). Since it was seen February 7, 1904, at Arroyo Seco, 8,000 feet (Surber), it had evidently wintered not far to the southward.

The first spring migrant was noted March 1, 1895, at Halls Peak, 8,000 feet (Barber); March 14, 1915, at Chloride (Ligon); and April 3, 1915, at State College (Merrill).—W. W. COOKE.

NEST.—In old woodpecker holes, and also in bird boxes. *Eggs*: 4 to 6, pale blue.

FOOD.—Four-fifths insects, only a small part of which are useful, including beetles (among them individuals from about a dozen harmful families), caterpillars, grasshoppers, crickets, and a small per cent of bees, bugs, ants, and spiders. Insect eggs are also eaten. The vegetable food is mainly wild berries, as elderberry and mistletoe [cedar berries in winter (Cockerell)]. The bird is an eminently useful species (Beal).

GENERAL HABITS.—The Chestnut-backed Bluebird is a bird of Transition Zone, being abundant in the open yellow pine country in lumbered woods and along roadsides, but in the fall it is also abundant in the Upper Sonoran nut pine and juniper country.

At Glorieta, on the edge of Transition Zone, the first week of July, 1903, we found a pair feeding young in their nest in the knot hole of a cottonwood elbow. In the yellow pines, on September 7, 1904, we found them between Tusas River and Hopewell. In the open park and yellow pine country of the Jicarilla Apache Reservation, the richly colored Chestnut-backs were among our commonest birds. At Lake Burford, one was taken September 20, 1904, in beautiful fall plumage, and three at Horse Lake, September 23, which had apparently almost completed their molt. They were also abundant in similar parts of the Gallinas Mountains before the cold snap of October 9, although after that, while still fairly common, they were not seen in such large numbers. On October 7, they were found in the aspens at about 10,200 feet. Two taken, October 9, were apparently in perfect winter plumage. They were very common in flocks, early in September, 1906, in Valle Santa Rosa and the adjoining valleys and rocky hillsides. Late in September they and the Pinyon Jays were the most abundant birds of the timbered part of the plateau country crossed between Acoma and Old Fort Tularosa, at that time frequenting both yellow pine and nut pine and juniper country.

Chestnut-backs were seen on October 16, 1906, as we were climbing the Mogollon grade, and the next day, in Silver Creek gulch. Here, numbers that had gathered at sunrise on the sunny side of the cold narrow gulch, with friendly companies of juncos, White-crowned Sparrows, and Audubon Warblers, were seen eating elderberries. On October 18 and 20, they were seen at about 9,000 feet on pine ridges, numbers of them on the twentieth. A cold wave and snowstorm overtook us then, but on the twenty-third, when the storm was over, a

flock of ten Bluebirds were seen flying over a pine ridge, and as the weather moderated again they were seen and heard every day until we left, the last of the month. Early in November they were abundant in flocks at Glenwood, at the foot of the mountains. Twenty-one were counted in one flock, including young, and handsome, richly colored adults.

At Wingate, where Mr. Hollister found them common, "one pair, with their brood in an old log shack, were busy from early morning until late evening, feeding the young with small green caterpillars, which were abundant on the shrubbery" (MS). In the Zuni, Sacramento, and Datil Mountains, he also found them common. In the Zuni Mountains they were abundant by July 20, going about in flocks of adults and full grown young, the young still in juvenal plumage. In the first half of September, 1902, they were common in the south end of the Sacramento Mountains, and in all open mountain parks throughout this range and the White Mountains, as well as in the Ruidoso and Hondo Valleys; and in the Datil Mountains, October 4-24, 1905, they were perhaps the most abundant and conspicuous birds, going about in large flocks.

In the Capitan Mountains Mr. Gaut found them very numerous during July, 1903, low down on the southern slopes at an altitude of about 8,000 feet, most especially in the strip where the yellow pines and alligator-barked junipers (*Juniperus pachyphloea*) come together and overlap.

ADDITIONAL LITERATURE.—FINLEY, W. L., American Birds, 163-171, 1907 (nesting habits).

MOUNTAIN BLUEBIRD: *Sialia currucoides* (Bechstein)

DESCRIPTION.—*Male*: Length 6.5-7.9 inches, wing 4.6-4.8, tail 3-3.1. *Female*: Length 7-7.2 inches, wing about 4.2, tail 2.7-2.9. *Adult male*: Upperparts plain rich turquoise or cerulean-blue, wings and tail slightly more violet-blue; underparts paler and duller, belly white. (In winter, duller, blue of upperparts obscured by grayish brown or brownish gray feather tips, and of underparts with wash of grayish or brownish.) *Adult female*: Head and back gray, sometimes faintly tinged with greenish blue; rump, upper tail coverts, tail, and primaries turquoise or light cerulean-blue; wing coverts gray or bluish; orbital ring white, underparts pale brownish gray (sometimes buffy gray), fading to dull white on belly. (In winter, coloration slightly deeper.) *Young*: Brownish or grayish, somewhat streaked with white; wings and tail partly blue.

RANGE.—Breeds in Canadian and Transition Zones from southeastern Alaska, southern Yukon, central Alberta, central Saskatchewan, and southwestern Manitoba south to western Nebraska, mountains of Chihuahua and Arizona, and Sierra Nevada and Cascades; winters from California and Colorado south to Texas, Kansas, Sonora, and Lower California; casual at Great Slave Lake and Great Bear Lake.

STATE RECORDS.—The mountains and valleys of New Mexico constitute the southern extension of the breeding range of the Mountain Bluebird. It breeds

south to the Sacramento Mountains, where young in the nest were noted in the James Canyon, about 6,500 feet, June 19, 1913 (Ligon); to Silver City, 6,000 feet (Fisher); and to near Beaver Lake in the Gila Forest Reserve, where a nest with eggs was found at 7,200 feet May 23, 1913 (Ligon). It was found at Fort Wingate, 7,000 feet (Coues); a few were seen at 8,000-8,500 feet in the Zuni Mountains (Goldman). [At Lake Burford, about 6,000 feet, a nest with young was found May 26, 1918 (Wetmore).] It breeds east to La Cuesta, 5,500 feet; Ribera, 6,000 feet (Bailey); Halls Peak (Barber); [was common west of Elizabethtown, June 18, 1924, and also around timberline, where it undoubtedly nests. Nests with young were found at 10,000 feet, 30 miles south of Taos, on June 21, 1919, and at 10,000 feet, 4 miles north of Cowles, July 16, 1919; many young were seen, July 21, 1919, on telephone wires about Taos, at 7,500 feet (Ligon). It is common in northern Santa Fe County up to 8,000 feet, fresh eggs being found May 1-June 20 (Jensen, 1922)]; it breeds at Santa Fe at 7,000 feet (Henshaw); and at Rinconada, 5,800 feet, where a nest with eggs was found April 15, 1904 (Surber). A specimen was taken at Mesilla Park, June 3, 1903 (Metcalf); but it was probably a non-breeding straggler.

Early in the fall the old and young gather in flocks on the upper slopes of the mountains, where they were found July 25, 1903, at 11,000 feet near Pecos Baldy, and on August 11, 1903, at 12,300 feet on Truchas Peak (Bailey). [On July 18, 1919, great numbers were seen at about 12,500 feet on the open divide connecting Pecos Baldy and the Truchas Peaks (Ligon).] They were seen on September 17, 1903, at 12,000 feet on the top of the mountains north of Taos; in August, 1904, at 13,400 feet in the Culebra Mountains (Bailey); and during October, 1903, near the top of Wheeler Peak, 13,600 feet (aneroid), the highest point in New Mexico (Surber). The species also spreads east in the fall to Folsom (Howell); and was quite common along the border of the foothills near Koehler Junction, July 28-October 24, 1913 (Kalmbach). In the fall of 1913, the first appeared October 12, at Mesilla (Merrill).



Photograph by Robert B. Rockwell

FIG. 100. Mountain Bluebird at Nest
Its exquisite turquoise or greenish blue makes it the most beautiful of the Bluebirds

It winters commonly in New Mexico throughout the length of the Rio Grande Valley from Espanola, 5,600 feet, on the north (Surber), to Mesilla, 3,800 feet, nearly at the southern boundary (Ford). In the Guadalupe Mountains several were seen at 4,500 feet January 15, 1915; [on the Rio Grande Bird Reserve an adult male was seen, December 8, 1916 (Willet).] It also winters at 4,000 feet on the Gila River (Stephens); at Las Vegas, 6,500 feet (Mitchell); and up to 8,000 feet at Arroyo Seco (Surber).—W. W. COOKE.



MAP 52. MOUNTAIN BLUEBIRD

Triangles mark breeding and probable breeding records

NEST.—In old woodpecker holes, often in aspens and also about houses. Eggs: 5 to 7, pale greenish blue.

FOOD.—So far as known, over 90 per cent insects and less than 10 per cent of wild or waste fruit. The insects include small cicadas, cutworms, grasshoppers, locusts, crickets, ants, bees, wasps, caterpillars, beetles, and alfalfa weevils (one young bird had eaten 70 alfalfa weevil larvae). In the season of fruit and grain it subsists mostly upon insects and eats fruit and other vegetable food only in the

season when nothing but left-over waste products can be obtained. Its presence should be fostered at every opportunity (Kalmbach).

GENERAL HABITS.—The beautiful greenish blue Mountain Bluebird, which, as Mr. Ligon says, like the Western Robin and Gray-headed Junco, is widely distributed in the Sangre de Cristo Mountains, was nearing the end of its nesting season when we reached the Upper Pecos in 1903, for while we found a nest in a grove of aspens on the edge of the open grassy mesa at 10,300 feet, we found families of old and young going about together at 11,000 feet. By August 5, numbers of Mountain Bluebirds, Chipping Sparrows, Flickers, and Juncos were wandering about in families, the woods as well as the open meadows being delightfully filled with birds. On August 11, we were much pleased to find a flock of the Bluebirds, together with Red-shafted Flickers and Chipping Sparrows, at 12,300 feet, on a protected slope in the dwarf timberline trees on the south side of Truchas.

The next year, in the middle of September, on the east slope of the mountains north of Taos, Mr. Bailey saw one catching grasshoppers on the wing above 12,000 feet. Early in the month it had been one of the commonest birds, found wherever the open slopes and big grassy stretches afforded good feeding grounds. Two years later, early in September, we found the Mountain Bluebird in the Jemez Mountains with the Chestnut-backed, and on November 6, a large flock, mainly young, was seen in the junipers bordering Cactus Flat at the foot of the Mogollon Mountains.

In Santa Fe, in the days of the early surveys, Colonel McCall found this Bluebird nesting in bird boxes, and it is to be hoped that as the higher part of the country becomes more settled and bird houses are habitually offered it, this, the most beautiful of all the Bluebirds, may, like the easterner, come to be a bird of the dooryard, where its exquisitely tinted plumage, its soft, musical warble, and its gentle ways may be enjoyed to the full by its human neighbors.

ADDITIONAL LITERATURE.—TRAFTON, G. H., *Methods of Attracting Birds*, 26, 1910.

TOWNSEND SOLITAIRE: *Myadestes townsendi* (Audubon)

DESCRIPTION.—*Length:* 7.8–9.5 inches, wing 4.3–4.8, tail 4.1–4.7. *Bill short, flattened, widened at base and deeply cleft; wings long and pointed, tail double-rounded, feathers tapering; feet weak. Adults:* Brownish gray, paler beneath; tail with middle feathers like back, outside feathers with terminal half of outer web dull white and inner web broadly tipped with white; *wings dusky with two whitish bars and bases of quills largely buffy at base; under surface of quills showing oblique buffy bands. Young:* Head and upperpart of body spotted with buff, the feathers broadly margined with blackish; underparts pale buff, the feathers margined with black or sooty.

RANGE.—Breeds in Boreal Zones from east-central Alaska, southwestern Mackenzie, and western Alberta south through Rocky Mountains to New Mexico and

Arizona, and through Cascades and Sierra Nevada to San Bernardino Mountains, California; reported breeding in Transition Zone in mountains of Durango, Zacatecas, and Coahuila; winters from southern British Columbia and Montana south, straggling to central Texas, Kansas, and Illinois. Recorded from Saskatchewan and Manitoba.

STATE RECORDS.—As a breeder the Townsend Solitaire is rather rare in New Mexico, and is confined during the summer to the higher parts of the mountains. A nest with fresh eggs was found on July 28, 1903, at 12,000 feet on Pecos Baldy. On the same day a grown young one was taken at 11,000 feet, and later the species was found above timberline at 12,600 feet on Truchas Peak. It remained as high as 11,600 feet until at least August 17, but it was also seen about July 15 at 8,000 feet on the Pecos near Willis and undoubtedly nested at this altitude, as it does in Colorado. Young both in and out of the nest were found at 11,400–12,000 feet on the mountains above Taos, July 24, 1904, and speckle-breasted grown young were flying about between Twining and Amizett, August 8, and at 7,900 feet in the Hondo Valley on August 13. Grown young were seen August 15, 1904, above Questa, at 8,050 feet (Bailey). [It is common in the Sangre de Cristo Mountains above 8,000 feet. Nests were found in Santa Fe Canyon, June 22, 1920, one with four eggs, and three others, respectively, with four and five eggs and five young; June 16, 1921, a nest with three eggs; and in 1922, on June 11, a nest with three well-incubated eggs; June 27, one with four small young; and July 12, one with four fresh eggs (Jensen).] In 1873, a specimen was collected July 18, as low as Fort Wingate, 7,000 feet (Henshaw). It breeds in the Chuska Mountains, where it was noted in July, 1907 (Gilman); and eggs were found at 10,000 feet in the mountains above Las Vegas on June 7, 1898 (Mitchell). [It was found apparently nesting, July 7, 1917, in the Black Range west of Harmosa (Ligon).]

In the fall migration, late in August, 1851, it was taken in the Zuni Mountains (Woodhouse); and by September 2, 1889, individuals had worked south to Cooney (Barrell). On September 19, 1904, one was taken in the pines between Dulce and Lake La Jara, and it was common September 30 at the Burford Lakes (Bailey). On September 24, 1913, near Koehler Junction, two were seen and one taken (Kalmbach); on October 24 and 26, 1893, near Clapham, two were seen and one taken (Seton); it descended to 5,000 feet at Fruitland, October 17–27, 1908 (Birdseye); and to 3,500 feet at Roswell, October 20, 1898 (Barber).

In winter, it was fairly common at Las Vegas, 6,700 feet, December, 1882 (Bat-chelder); quite common at Currumpa, January 19, 1894 (Seton); common at Espanola during December and January (Loring); and found all winter at Arroyo Seco, 8,000 feet (Surber). It winters abundantly in New Mexico, gathering in flocks that sometimes contain several hundred individuals, and at this season coming into southern New Mexico to Cliff, November 5, 1906 (Bailey); Silver City, November 29, 1883, to March 24, 1884 (Marsh); Apache, October to April 30, 1886 (Anthony); Fort Webster, October to late March (Henry); [Rio Grande Bird Reserve (Elephant Butte), seen between November 23 and December 9, 1916 (Willett)]; and east to Corona, October 23, 1902 (Gaut); while in the San Andres Mountains, December 7–20, 1902, it was the most common bird found on Salinas Peak (Gaut). In the Guadalupe Mountains it was plentiful above 5,000 feet in January, 1915 (Willett). [In December, 1918, it was seen in the cottonwoods in Albuquerque (Piper).]—W. W. COOKE.

NEST.—On logs or stumps, on banks of streams, or on ledges of rock; usually a bulky, well-rounded cup, made largely of conifer twigs, bark, fine roots, grass, weed stalks, pine needles, and black moss, lined with fine grass; but sometimes made entirely of pine needles. Eggs: 3 to 6, faint grayish blue, ground color nearly ob-

scured by markings varying from brick-red to lavender; in others pale blue, spattered with lavender, brick-red, and brown blotches and spots of lengthwise trend, thickest at larger end.

FOOD.—Insects, including large black ants, and caterpillars; also small wild fruits including chokecherries, serviceberries, rose haws, honeysuckle berries and elderberries. In fall and winter mainly juniper berries and pine seeds.

GENERAL HABITS.—The Solitaire, when seen in silhouette perching on a dead branch, appears as a large, dark bird, about the size of a Pine Grosbeak, with a long hanging tail and a surprisingly short bill. During the nesting season it is one of the most interesting birds of the Sangre de Cristo Mountains. When climbing Pecos Baldy, on a flat-topped grassy ridge at 12,000 feet, where Pipits were nesting and Horned Larks flying around with grown young, we flushed one of the Solitaires from an old charred log and to our surprise discovered its nest fitted into a burned hollow underneath, resting on the ground roofed over by the log. In this case the nest was made from material close at hand—grass and weed stems. Later, when climbing Truchas Peak, we found one of the birds in the straggling dwarf spruces at 12,600 feet. Near camp, at the foot of Pecos Baldy at 11,600 feet, one was found perching on a low branch from which, as it flew down to the ground for food, the light line down its wing showed effectively. Here one was also seen on the top of a boulder bathing in a little rain pool, unconscious of observers.

In the mountains north of Taos, at 11,400 feet, as late as August 2, we saw an old bird flying around catching insects and feeding them to a young one out of the nest. In flycatching it fluttered around in the air much like a Waxwing, frequently giving its plaintive call note.

On the Upper Pecos in 1883, during the last half of July, Mr. Henshaw found "families of young birds in the curious mottled plumage resembling young thrushes, being led through the pines by the old birds" (1885-1886, p. 331).

The relation of the Solitaire to the thrushes in habit was impressed upon Mr. Ridgway when he disturbed one near its nest. In an anxious manner that betrayed its secret, he says, "it flitted before us, now and then alighting upon the ground, and, with drooping and quivering wings, running gracefully, in the manner of a Robin, then flying up to a low branch, and, after facing about, repeating the same maneuvers—evidently trying to entice us away from the spot" (1877, p. 408).

After raising its young in the high mountains, the Solitaire descends to the junipers, where it molts—one was found in the midst of its molt on September 19—surrounded by conveniently abundant juniper berries.

In going down from the spruces and pines into the junipers on our way down the Gallinas Mountains early in October, 1904, and in

the Pinyon Mountain region in October, 1906, we found Solitaires common and singing a surprisingly full rich song. At San Rafael, where they were common late in October, 1908, Mr. Bailey often heard them "singing up on the juniper covered ridges back of town, where ripe, sweet berries of the one-seeded juniper (*Juniperus monosperma*) were abundant. Having been frosted, the berries were soft and juicy and as sweet as honey, with only a slight resinous flavor to which the birds did not seem to object" (MS). Solitaires were common in the junipers at Glenwood at the foot of the Mogollons early in November, 1906, and one was found by Mr. Ligon, November 27, 1913, in the San Mateo Mountains, Socorro County, at about 6,500 feet, singing softly in some bushes, although it had several cedar berries in its throat.

In the days of the Wheeler Survey, in the fall, at the Old Crater forty miles south of Zuni, Mr. Henshaw found Solitaires "congregated in very large numbers about a spring of fresh water, the only supply for many miles around"; and he says that hundreds were to be seen sitting on the bare volcanic rocks, apparently too timid to venture down and slake their thirst while the party was camped near by. Their song, he said "is occasionally heard even in November and December, and is very sweet, but not so full and varied as during the vernal season" (1875, p. 232).

The noted song, heard at its best on the nesting grounds in the high mountains, is often given from the top of a tall conifer overlooking snowbanks. Here in the strong pure mountain air it rings out in rare harmony with the spirit of the mountains. While the songs of the thrushes suggest the soft, solemn music of dim cathedral aisles, that of the Solitaire suggests the loud ringing notes of a rapt cornetist of the peaks. Even the late fall songs, heard in the junipers, were clarion, musical outbursts, with runs and liquid turns. In the Yosemite, Grinnell and Storer state, "no other bird . . . except perhaps the American Dipper, seems to have quite such a revival of song in the fall as does the Solitaire." Even in early winter it gives "occasional outbursts of song fully as melodious as those of summer and more impressive in the prevailing chill and silence" (1924, p. 596). The flight song of the Solitaire, Mr. Saunders considers the best of any bird he knows. As he describes it, "The bird soars high above the rocky peaks and ridges till almost invisible; and the glorious, loud and ringing song descends to the listener, each note as clear and pure and full of life and vigor as the mountain air itself" (1910, p. 199).

ADDITIONAL LITERATURE.—ANTHONY, A. W., Condor, V, 10-12, 1903 (nest).—DAWSON, W. L., Condor, XXI, 12-21, 1919 (nest).—HANFORD, F. S., Condor, XIX, 13-15, 1917.—MAILLIARD, JOSEPH, Condor, XXVIII, 127, 1926 (singing in autumn).—MILLER, O. T., Upon the Tree-Tops, 205-226, 1897.—PIERCE, W. M., Condor, XVIII, 181-182, 1916 (nest).

KINGLETS, GNATCATCHERS, etc.: Family Sylviidae

The American representatives of this large Old World family are easily recognized by their small size, usually five inches or less; slender bill, more or less notched or even hooked at tip; ten primaries, the first short; and greenish or bluish coloration.

GNATCATCHERS: Subfamily Polioptilinae

WESTERN GNATCATCHER: *Polióptila caerúlea obscura* Ridgway

DESCRIPTION.—Length: 4-5.5 inches, wing 2-2.2, tail 2-2.2. *Adult male*: Upperparts bluish gray, forehead and sides of crown, black, making a U-shaped mark; wings slaty, with pale gray edgings; upper tail coverts and tail black, the lateral tail feathers largely white; underparts white, washed with bluish gray. *Adult female*: Similar, but duller, and without black on head. *Young*: Similar to adult female but upperparts brownish gray and texture of plumage looser.

COMPARISONS.—The two gnatcatchers found in New Mexico are easily distinguished by their head markings, the Western having only a U-shaped black mark, the Plumbeous having the whole crown glossy black. (See p. 584.)

RANGE.—Breeds in Sonoran Zones from Siskiyou County, California, southern Nevada, southern Utah, and Colorado south to Pecos River, Texas, Guanajuato, Mexico, and Cape region of Lower California; winters from southern California and southern Arizona to Puebla, Morelos, Colima, and Cape San Lucas.

STATE RECORDS.—The middle altitudes of New Mexico are occupied in summer by the Western Gnatcatcher, which breeds east to Apache (Anthony); Silver City and the neighboring Pinos Altos Mountains (Fisher); [Black Range, about 6,300 feet (Ligon, 1916-1918)]; and to the valley of the Rio Grande at Rinconada (Surber). It breeds commonly in the San Luis Mountains (Mearns); Cooney (Barrell); at Fort Wingate, 7,000 feet (Hollister); and eggs were found on June 16, 1907, at Shiprock, 5,000 feet (Gilman). [It is frequently seen in pairs or small flocks in the Santa Fe region on the pinyon flats in May and June, and two pairs have been found nesting (Jensen). A nest with four slightly incubated eggs was found 2 miles west of Chloride at 6,250 feet, May 27, 1917 (Ligon).] It thus seems to be confined in the breeding season to the altitude of 5,000-7,000 feet. A single specimen was taken June 15, 1903, at Montoya, 4,700 feet (Bailey).

After the nesting season, it was taken August 9, 1905, at Laguna, 5,800 feet (Hollister); August 13, 1904, at 8,000 feet in the Arroyo Hondo (Gaut); August 20, 1906, at the mouth of Santa Clara Canyon, 7,000 feet (Bailey); was common August 24-30, 1905, at Isleta; fairly common September 18-20 at Burley (Hollister); and was not rare August 1, 1908, in the Animas Mountains from the oaks at 5,800 feet to the pines of the summit at 8,000 feet (Goldman).

Its arrival in spring was noted at Apache April 1, 1886 (Anthony); Organ Mountains, April 1, 1903 (Metcalf); Silver City, April 22, 1884 (Marsh); Fort Webster, April 12 (Henry); and Rinconada April 26, 1904 (Surber).—W. W. COOKE.



From Handbook of Western Birds

FIG. 101. Gnatcatchers (*Polióptila caerúlea caerúlea*)

Vivacious, talkative little home makers

NEST.—In bushes or trees, deeply cup-shaped, compact, made largely of shreds of bark and leaves; lined with finer shreds and feathers, the outside decorated with lichen. *Eggs:* 4 or 5, pale greenish white, spotted with reddish brown and purplish, most heavily about the larger end.

FOOD.—Almost exclusively insects, including beetles, wasps, bugs, and caterpillars, with a few flies, grasshoppers, and spiders. Bugs make up more than half of the food—stink-bugs, shield-bugs, tree hoppers, leaf hoppers, leaf bugs, and black olive scales (in one stomach, 20 per cent)—all harmful to trees and other plants. Wasps and a few ants make up over 16 per cent. "Like the titmice and kinglets, gnatcatchers are fitted by nature to perform a service which larger species are unable to accomplish" (Beal).

GENERAL HABITS.—The intense, vivacious little Western Gnatcatcher is always talking about something important, and always whipping around as he talks. One met with in the Hondo Valley in August had whipped around so effectively that he had worn off nearly all the white from his tail feathers and reduced some of them almost to shafts!

To one interested in the study of bird psychology, a Gnatcatcher's beautiful nest offers rich opportunity, for both parents are vitally concerned at all stages of the family history; they express freely and fully all they feel, and they feel an amazing amount for a small pinch of feathers.

ADDITIONAL LITERATURE.—MERRIAM, F. A., A-Birding on a Bronco, 38-64, 1896.—MYERS, H. W., Condor, IX, 48-51, 1907.

PLUMBEOUS GNATCATCHER: *Polióptila plúmbea plúmbea* (Baird)

DESCRIPTION.—*Length:* About 4.2-4.6 inches, wing 1.9-2, tail 2.1-2.2. *Adult male in spring and summer:* Top of head glossy black in sharp contrast to bluish gray of back; upper tail coverts and tail black, outside tail feather with outer web white except at base, inner web tipped with white; wings slaty, with paler edgings; underparts white, washed with bluish gray on sides. *Adult male in fall and winter:* Similar, but black feathers of head more or less tipped with slate-gray. *Adult female:* Similar to adult male but head slate-gray, without black, rest of upperparts brownish gray varying to hair-brown.

RANGE.—Lower Sonoran Zone from southeastern California, Arizona, and New Mexico to Rio Grande Valley, Texas south to Tamaulipas, Nuevo Leon, Sonora, and Cape San Lucas.

STATE RECORDS.—The Plumbeous Gnatcatcher occurs very locally in New Mexico; a pair were taken April 4, 1886, at Apache, which were the only ones seen in more than a year's residence (Anthony); grown young were seen July 30, 1901, at Carlsbad, and a few days later the species was found not rare in the Guadalupe Mountains (Bailey). For 200 miles north of Apache, in the valleys of the Gila and San Francisco, the bird is not known, but it appears again at Fort Wingate apparently coming up the valley of the Rio Puerco of the West from Arizona. Here a specimen was taken July 5, 1864 (Coues); and one was seen near Gallup late in July, 1909 (Fisher). [On the Carlsbad Bird Reserve they were seen occasionally in December, 1916 (Willett).]—W. W. COOKE.

NEST.—One near Terlingua, Texas, in a *fouquieria* bush, made of gray fibers of wood and bark, wound with spider web, and lined with cactus wool. *Eggs*: 2, pale blue, spotted with brown, most thickly around larger end.

KINGLETS: Subfamily Regulinae

Bill straight and slender, nostrils overshadowed by tiny feathers; tarsus booted, tail emarginate; "elegant and dainty little creatures, among the very smallest of our birds excepting Hummers. They inhabit woodland, are very agile and sprightly, insectivorous, migratory, and highly musical" (Coues).

WESTERN GOLDEN-CROWNED KINGLET: *Régulus sátrapa oliváceus* Baird

PLATE 63

DESCRIPTION.—*Length*: 3.1–4.5 inches, wing, 2.1–2.2, tail 1.6–2, bill .2–.3, tarsus .7. *Adult male*: Squarish crown patch, black outside, inclosing a yellow V with an orange center; rest of upperparts greenish olive, wings and tail dusky, with yellowish edgings, wings with two yellowish bands, secondaries with a dusky band; underparts dingy whitish, sides more yellowish olive. (In fall and winter, colors brighter). *Adult female*: Similar, but orange of crown patch replaced by yellow. *Young in juvenal plumage*: Similar to adults but head brownish gray or grayish olive bordered laterally with an indistinct black line, general color more brownish olive, and texture of plumage much looser.

RANGE.—Breeds in Boreal Zones from Kodiak Island and Kenai Peninsula, Alaska, and northern Alberta south to Rocky Mountains of northern New Mexico and northern Arizona, and to the San Jacinto Mountains, California; winters from southern British Columbia (casually Alaska and Colorado) to highlands of Mexico and Guatemala.

STATE RECORDS.—A young Western Golden-crowned Kinglet was taken July 31, 1903, at 11,000 feet on Pecos Baldy, and both old and young were taken August 5–8, 1904, at 10,700 feet near Twining in the Sangre de Cristo Mountains (Bailey). [July 18, 1919, an adult male in full breeding plumage, accompanied apparently by young, was taken 8 miles northeast of Cowles, at about 9,800 feet; June 16–21, 1924, breeding birds were common in the Sangre de Cristo Range, and July 4, 1927, two nests containing very small young were found on Lake Peak, in the Sangre de Cristos, at 11,500 feet (Ligon).] These are the only summer records of the species in New Mexico and mark the extreme southern limit of the breeding range in the Rocky Mountains.

In the fall migration they have been noted in the Chuska Mountains October 1–12, 1908 (Birdseye); and in the Manzano Mountains, October 25, 1903 (Gaut).

A few individuals winter in the State, as a small flock was seen December 17, 1902, on the north slope of Salinas Peak (Gaut).

In the spring migration, the species was seen at Silver City, May 3, 1884 (Marsh). W. W. COOKE.

NEST.—20 to 50 feet or more from the ground, hung from the end of a spruce or fir branch; a ball-like mass of green moss and lichens, interwoven with small twigs, lined with fine bark fibers, cow or rabbit hair, and feathers. *Eggs*: 5 to 10, creamy, reddish white, clouded around the larger end with fine reddish brown dots, and sometimes pen lines.

FOOD.—Mainly tree-infesting insects and their eggs.

GENERAL HABITS.—Like the Wrens and the Verdin, the Kinglet builds dummy nests, convenient shelters for the hardy northerners in cold weather.

Its usual call note is a fine *ti-ti*, and its song, as given by Mr. Brewster, "*ti, ti, ter, tzee, tzee, tzee, tzee, ti-ti-ti-ti.*"

ADDITIONAL LITERATURE.—BOWLES, J. H., Condor, VI, 163-165, 1904.—SHELDON, H. H., Condor, X, 123-124, 1908.—WRIGHT, M. O., Educational Leaflet 34, Nat. Assoc. Audubon Soc.

ASHY RUBY-CROWNED KINGLET: *Corthylio caléndula cineráscens* (Grinnell)

PLATE 63

DESCRIPTION.—(Type): Length 4.6 inches, wing 2.4, tail 1.9, bill .3, tarsus .7
Adult male: Crown patch bright red, usually more or less concealed; rest of upperparts ashy olive, slightly greenish on rump; wings and tail dusky, with whitish edgings, wings with two light bars, and a partial bar of black; orbital ring white; underparts ashy white faintly tinged with olive-buff. *Adult female:* Similar to male but without the red crown patch.

RANGE.—Breeds in Boreal Zones in western United States south in mountains to central New Mexico, southern Arizona, and southern California; winters from western United States south to northern Mexico.

STATE RECORDS.—The Ruby-crowned Kinglet is much more common as a breeder in New Mexico than the Golden-crowned. [Rather abundant throughout the Sangre de Cristo Range from 8,000 feet to timberline (Ligon, 1919).] It was one of the commonest birds at 11,000-11,600 feet below Pecos Baldy from July 21, 1903, when young were in the nest, to August 17, when they were fully fledged. The next year it was common, July 26, on Wheeler Peak, at 11,400 feet, while it was still feeding young on August 17, 1904, at 11,000 feet on Lost Trail Creek in the Culebra Mountains west of Costilla Pass (Bailey). A single bird was taken on June 13, 1909, at 9,000 feet on Bear Ridge in the Zuni Mountains (Goldman). It will undoubtedly be found breeding in the higher parts of the Jemez, Gallinas, and San Juan Mountains, whenever these districts are visited during the early summer. [In the Black Range, 28 miles southwest of Chloride, at 8,000 feet, on June 28, 1920, two pairs were feeding young out of the nest (Ligon).]

The fall migration had apparently already begun on August 16, 1904, for it was found presumably below the lower limit of its breeding range and was noted at 8,400 feet in the Red River Valley of the Culebra Mountains (Gaut). On September 11, 1909, it was taken near Monica Spring in the San Mateo Mountains, and by September 19, 1908, it had reached the Burro Mountains, 6,500 feet (Goldman). During October it is quite generally distributed throughout the mountains of New Mexico and descends to Fruitland, 5,000 feet (Birdseye); Cliff, 5,000 feet (Bailey); Las Palomas, 4,200 feet (Goldman); and Mesilla Park, 3,800 feet (Ford).

It winters in New Mexico at Silver City (Hunn); Mesilla Park (Ford); Tularosa and Salinas Peak (Gaut); and at Las Vegas remained at least as late as December 18, 1882 (Batchelder).

In the spring migration, it was taken at Rinconada April 17, 1904 (Surber); and was noted at Carlisle as late as May 17, 1890 (Barrell). In the Guadalupe Mountains it was fairly common up to 5,000 feet in January, 1915 [common in December, 1916; also on the Rio Grande Bird Reserve, common November 23-December 9, 1916 Willett].—W. W. COOKE.



MEXICAN CROSSBILL

FEMALE

MALE

WESTERN GOLDEN-CROWNED KINGLET

MALE

FEMALE

ROCKY MOUNTAIN EVENING GROSBILL

ASHY RUBY-CROWNED KINGLET

GENERAL HABITS.—Like the Wrens and the Verdin, the Kinglet builds dummy nests, convenient shelters for the hardy northerners in cold weather.

Its usual call note is a fine *ti-ti*, and its song, as given by Mr. Brewster, "*ti, ti, ter, tzee, tzee, tzee, tzee, ti-ti-ti-ti.*"

ADDITIONAL LITERATURE.—BOWLES, J. H., Condor, VI, 163-165, 1904.—SHELDON, H. H., Condor, X, 123-124, 1908.—WRIGHT, M. O., Educational Leaflet 34, Nat. Assoc. Audubon Soc.

ASHY RUBY-CROWNED KINGLET: *Corthylio caléndula cineráscens* (Grinnell)

PLATE 63

DESCRIPTION.—(Type): Length 4.6 inches, wing 2.4, tail 1.9, bill .3, tarsus .7
Adult male: Crown patch bright red, usually more or less concealed; rest of upperparts ashy olive, slightly greenish on rump; wings and tail dusky, with whitish edgings, wings with two light bars, and a partial bar of black; orbital ring white; underparts ashy white faintly tinged with olive-buff. *Adult female:* Similar to male but without the red crown patch.

RANGE.—Breeds in Boreal Zones in western United States south in mountains to central New Mexico, southern Arizona, and southern California; winters from western United States south to northern Mexico.

STATE RECORDS.—The Ruby-crowned Kinglet is much more common as a breeder in New Mexico than the Golden-crowned. [Rather abundant throughout the Sangre de Cristo Range from 8,000 feet to timberline (Ligon, 1919).] It was one of the commonest birds at 11,000-11,600 feet below Pecos Baldy from July 21, 1903, when young were in the nest, to August 17, when they were fully fledged. The next year it was common, July 26, on Wheeler Peak, at 11,400 feet, while it was still feeding young on August 17, 1904, at 11,000 feet on Lost Trail Creek in the Culebra Mountains west of Costilla Pass (Bailey). A single bird was taken on June 13, 1909, at 9,000 feet on Bear Ridge in the Zuni Mountains (Goldman). It will undoubtedly be found breeding in the higher parts of the Jemez, Gallinas, and San Juan Mountains, whenever these districts are visited during the early summer. [In the Black Range, 28 miles southwest of Chloride, at 8,000 feet, on June 28, 1920, two pairs were feeding young out of the nest (Ligon).]

The fall migration had apparently already begun on August 16, 1904, for it was found presumably below the lower limit of its breeding range and was noted at 8,400 feet in the Red River Valley of the Culebra Mountains (Gaut). On September 11, 1909, it was taken near Monica Spring in the San Mateo Mountains, and by September 19, 1908, it had reached the Burro Mountains, 6,500 feet (Goldman). During October it is quite generally distributed throughout the mountains of New Mexico and descends to Fruitland, 5,000 feet (Birdseye); Cliff, 5,000 feet (Bailey); Las Palomas, 4,200 feet (Goldman); and Mesilla Park, 3,800 feet (Ford).

It winters in New Mexico at Silver City (Hunn); Mesilla Park (Ford); Tularosa and Salinas Peak (Gaut); and at Las Vegas remained at least as late as December 18, 1882 (Batchelder).

In the spring migration, it was taken at Rinconada April 17, 1904 (Surber); and was noted at Carlisle as late as May 17, 1890 (Barrell). In the Guadalupe Mountains it was fairly common up to 5,000 feet in January, 1915 [common in December, 1916; also on the Rio Grande Bird Reserve, common November 23-December 9, 1916 Willett)].—W. W. COOKE.



MEXICAN CROSSBILL

FEMALE

MALE

WESTERN GOLDEN-CROWNED KINGLET

MALE

FEMALE

ROCKY MOUNTAIN EVENING GROSBEEK

ASHY RUBY-CROWNED KINGLET

Alan Brooks

NEST.—Usually 9 to 30 feet from the ground, in spruce, fir or pine, semi-pensile, bulky, thick-walled, made of green moss, shreds of bark, and feathers, warmly lined with hair and feathers. *Eggs:* 5 to 11, whitish or pale buffy, faintly marked with pale brown, chiefly around the larger end.

FOOD.—Animal matter 94 per cent, and vegetable, 6 per cent. The vegetable matter is fruit—mainly elderberries—weed seed, poison oak, and leaf galls. Three-fourths of the food consists of wasps, bugs, and flies; and beetles make 12 per cent. The bugs are the most harmful kinds—tree hoppers, leaf hoppers, and jumping plant lice, which are pests and often do great harm to trees and smaller plants; together with plant lice and scale insects, which are the worst scourges of the fruit grower, and whose prevalence has almost risen to the magnitude of a national peril. It is these small and seemingly insignificant birds that most successfully attack and hold in check these insidious foes of horticulture (Henshaw).

GENERAL HABITS.—The Ruby-crown, which, in excitement, throws out and expands his partially concealed crown patch until it suggests a glowing scarlet blossom, is found in the nesting season in the high dark fir and spruce forest, which he lightens by his bright happy song—a most surprising song in its volume and richness, coming from the throat of such a diminutive bird. At this time he is alone with his family and we know him as an individual, but when on his fall journey south his identity is lost, for he is one of a multitude that take possession of our orchards. Here part of the flock will fill a tree so well that all its leaves seem winged. After closely inspecting the best insect hiding places, with a lift of the wing and a chatter, the busy company go trailing off to the next tree to carry on their good work.

We found them in the Pecos Mountains, at 11,000 feet, when we reached there July 21, 1903, their loud exuberant song being the commonest heard from the blue spruces. Two days later a pair, which we encountered in the woods at dusk, scolded us so roundly that when we discovered a dim third form, we understood their anxiety. By August 1, family cares were apparently too engrossing to allow of continuous concerts; a week later the songs were so rarely heard as to call for especial comment, and by August 17, at our 11,600-foot camp at the foot of Pecos Baldy, the young were flying about quite independently.

In the mountains above Taos the third week of July, 1904, the Ruby-crowns were still singing at 11,400 feet; on August 26, we suspected an occupied nest; and at 11,000 feet on Lost Trail Creek a parent was found feeding young. In the Jemez Mountains the last of August, 1906, and in the open parks of the San Juan Mountains early in September, the small birds were still singing brightly; while at Cliff, in the sunny cottonwoods bordering the Gila, November 8, one sang his full clear beautiful song over and over, as if his little heart were still full of the happiness of summer.

ADDITIONAL LITERATURE.—GRINNELL, J., Auk, XXXVII, 84-88, 1920 (notes). WEYDEMEYER, WINTON, Condor, XXV, 117-118, 1923 (song and nest).—WHITTLE, C. L., Auk, XL, 224-240, 1923; XLI, 327-333, 1924 (group habit).

PIPITS, etc.: Family Motacillidae

Suggesting a Sparrow in coloration and terrestrial habits, the American Pipit, which is the New Mexico representative of the family, differs in having a very slender, acute bill, notched at the tip. It has nine primaries, and feet long and slender, with the hind claw always lengthened and straightened.

AMERICAN PIPIT: *Ánthus spinolétta rubescens* (Tunstall)

DESCRIPTION.—*Length*: 6-7 inches, wing 3.2-3.5, tail 2.6-2.8, tarsus .8-.9. *Adults in spring and summer*: Upperparts usually grayish, tinged with olive or brown, indistinctly streaked, tail blackish, outside feather largely white, next tipped with white; wing blackish brown with two buffy wing bars and light edgings; line over eye, and underparts buffy (fading in summer), chest, sides, and flanks, streaked with dusky. *Adults in winter*: Upperparts browner or more olivaceous, underparts paler, more heavily streaked. *Young in juvenal plumage*: Similar to winter adults but scapulars and back darker, back distinctly spotted with dusky; line over eye indistinct or obsolete, streaks on chest usually heavier, those on sides and flanks indistinct or obsolete.

RANGE.—Breeds in Arctic Zone from northeastern Siberia, northern Alaska, northern Mackenzie, central Keewatin, and Newfoundland; on high mountains south to New Mexico, Colorado, and California; and from the Aleutians to Prince William Sound; winters from California (Vancouver Island, British Columbia ?), Arizona, New Mexico, east to Ohio and Delaware Valleys, south to Gulf coast and Guatemala.

STATE RECORDS.—From far northern Alaska, the breeding range of the American Pipit extends south, until it finds the southern limit on the mountains of north-central New Mexico. Here the species is confined during the breeding season to the tops of the highest peaks, and in 1903 was found both on Pecos Baldy and Truchas Peak from a little below timberline to near the top of the highest ridge, at 13,250 feet (Bailey). [In July, 1919, it was abundant over all the higher peaks of the Pecos region and was observed in great numbers on July 12, 17, and 18, on Tierra Amarilla, the three Truchas Peaks, and Pecos Baldy, feeding young. On June 15, 1924, it was rather common on all peaks of the Wheeler group, at and above timberline. Three nests were found, one with five partly incubated eggs, one nest only well started, and another about completed (Ligon).] In 1904, it was common on Wheeler Peak from timberline at 12,000 feet to the top of the peaks, at about 13,600 feet (aneroid, Bailey). On Culebra Peak it was found August 20, 1904, from 12,700 to 13,300 feet and had probably nested on the mountain (aneroid, Gaut).

In the fall, it was seen September 4, 1906, on Santa Clara Mountain at 11,000 feet (Bailey); and September 14, 1902, on the highest peak of the White Mountains at nearly 12,000 feet. On September 19, 1905, the first was seen in the foothills of the mountains at about 7,000 feet near Burley (Hollister); and on September 27, 1904, a flock was found in the open country near Lake Burford, 7,500 feet (Bailey). [At Stateline, between St. Michaels, Arizona, and Gallup, New Mexico, 12 were seen September 29, 1918 (Skinner).] Through October the species is scattered quite widely over the State at about 7,000-8,000 feet or even lower, as at Albuquerque October 9, 1900 (Barker). Near Koehler Junction, about 6,000 feet, it was common after October 6, 1913 (Kalmbach); and by the first week in November it descends

to the lower valleys, being noted November 1, 1902, at Corrizozo, about 5,000 feet (Gaut); and November 6, 1906, at Cliff in the Gila Valley below 5,000 feet (Bailey). By this time the larger part have left the State for the winter home in Mexico, though a single large flock was seen November 9, 1909, near Lake Valley (Goldman).

In winter, one was taken December 28, 1900, at Albuquerque (Birtwell). [On



From Biological Survey

FIG. 102. Pipit

A lover of wind-swept mountain tops

the Carlsbad Bird Reserve, it was common in January, 1915, was noted during the winter of 1915-16, and was common in December, 1916; while on the Rio Grande Bird Reserve (Elephant Butte), it was noted November 23-December 9, 1916 (Willett).]

During the spring migration, the first was taken March 20, 1903, at Mesilla Park (Ford); and April 8, 1892, at Lake Palomas near the southern boundary (Mearns).—W. W. COOKE.

NEST.—On the ground, bulky and rather compact, made of dried mosses and grasses, lined with hair and feathers. *Eggs*: 4 to 6, nearly uniform brown, from dense spotting.

FOOD.—Largely insects, but also crustaceans, small shells, and seeds. In winter, "when the consumption of insects by many other birds is at its lowest, the Pipit maintains a steady diet of white grubs and cotton boll weevils, two of the worst pests of the South. The bird can hardly be commended too highly and deserves complete protection at all times" (Gabrielson, 1924, p. 29).

GENERAL HABITS.—Seen by most persons either in migration or in winter, often on bare ground, the plain earthen colored Pipits are revealed by their movements, for they walk about with wagging heads and tipping tails. On rising in a body, they circle around, showing white outer tail feathers and giving their plaintive *cheep*.

In the spring migration in Alaska, when several flocks came into the gardens about Juneau and stayed about town for a week, Alfred Bailey commented that "they appear awkward as they stalk over the snow, but they are very inconspicuous in dried grass" (1927, p. 363).

During their migrations in Montana, Mr. E. S. Cameron noted, "they are fond of following the plow and seeking their food in the freshly turned up earth" (1907-1908, p. 51). On the prairie, in fall, they associate with horned larks and longspurs, when they can always be recognized by their buff, streaked underparts.

In Colorado the hardy birds have been seen bathing during a snow-storm, and their breeding grounds are high on the mountains. A nest found by Mr. Ligon just begun on June 15, 1924, was near the top of Wheeler Peak, under overhanging grass, within six inches of a huge snowdrift.

In the Sangre de Cristo Mountains, in the summer of 1903, they were the common Arctic-Alpine mountain top birds, being found from a little below timberline almost to the tops of the highest peaks. On July 28, on the broad, grassy side of a ridge, at 12,000 feet, we found a little band of them evidently at home on their breeding grounds, as some were carrying food. On August 13, one of the family guardians was seen pursuing a Sparrow Hawk above the top of Pecos Baldy, at 12,600 feet.

On Wheeler Peak, in the summer of 1904, we found them most abundant and feeding young in a glacial scoop above a moraine at 12,700 feet. Here, two short brooks that trickled down through the grass from the peaks afforded the only water that we found above timberline, and the basin gave protection from the winds that swept the open slopes, which even the wind-loving *Anthus* might appreciate when rearing a brood. A number of pairs were living in this immediate neighborhood. On July 26, young apparently full grown were still fluttering their wings to be fed. On another part of the peak above timberline, on July 22, our Taos Indian camp man, Sun-Elk, flushed a small bird from the ground, and found, hidden in the grass, a nest with four of the characteristic *brown* eggs. He did not notice what the bird was like, but Pipits, Rosy Finches, and the Southern White-tailed Ptarmigan are the only birds breeding at such altitudes, and the Pipit is the only one having brown eggs.

In the height of the breeding season, as Mr. Ligon says, the males are constantly singing, flying upward as they utter their interesting notes, then dropping back silently to some prominent stone or boulder—sometimes projecting above the snowdrifts—sitting quietly for a time and then repeating the performance. When we first climbed Pecos Baldy, on July 20, we heard the flight song a number of times, but after that, although we visited the *Anthus* basin three times more and

climbed the peak again, only suggestions of the flight song were heard, the old birds being fully occupied feeding young.

In the fall migration, from September 27 to October 3, 1904, we saw several flocks on the mud flats bordering the Burford Lakes, and they would sometimes rise and fly off over the sagebrush hills.

WAXWINGS: Family Bombycillidae

The bill of the Waxwings is well adapted to their food—insects and fruit—being short, broad, flat, plainly notched, and with widely cleft gape (the nostrils overarched by a scale); much of their insect food is caught in air and their wings are long and pointed, with ten primaries, but the first spurious (so short as almost to escape notice); the tail is short, and the feet, used only for perching, are rather weak. The head is conspicuously crested and the plumage is peculiarly soft, smooth, and silky.

BOHEMIAN WAXWING: *Bombycilla garrula pallidiceps* (Reichenow)

DESCRIPTION.—*Length*: About 7.4–8.7, wing 4.4–4.6, tail 2.7–2.9. Bill small, rather swollen, slightly hooked and notched at tip; loreal feathers dense, soft, velvet-like, almost concealing nostrils; head with a long crest of soft, blended feathers, the plumage in general soft and blended. *Adults*: *Body*, including high crest, soft fawn color, deeper anteriorly, fading to grayish on abdomen, sides, and flanks, and nearly pure gray on rump and upper tail coverts; tail and wings blackish, *tail tipped with yellow, primaries tipped with white or yellow*, the secondaries broadly tipped with white, the shafts usually prolonged into flattened, tear-shaped, *red wax-like appendages*; *forehead, cheeks, and under tail coverts deep brown*; chin (usually), lores, and eye streak extending back under crest, velvety black; bill black terminally, bluish gray basally. (In imperfect plumage, the wax-like appendages of secondaries are absent.) *Young*: Much duller than adults, the underparts streaked with brown or gray on a whitish ground.

COMPARISONS.—The large Bohemian can be distinguished from the Cedar Waxwing by greater size, usually black instead of brown chin, under tail coverts brown instead of white, and primaries tipped with white or yellow instead of gray. (See p. 592.)

RANGE.—Boreal Zones of Northern Hemisphere. In North America breeds from western Alaska, northern Mackenzie, and northeastern Manitoba south to (probably Montana), Idaho, and Washington; winters irregularly to California, Arizona (rarely), New Mexico, Kansas, Indiana, and east to Connecticut; casual in Arizona.

STATE RECORDS.—The first record for the Bohemian Waxwing in New Mexico is given by Mr. Ligon, who was fortunate enough to encounter a number of the rare birds on November 19, 1926, when climbing the steep northeast slope of Gold Hill in Taos County, at about 11,500 feet, where snow lay five or six inches deep in the timber. Three small flocks were seen, of nine, six, and eight individuals. The nine birds of the first flock were, he says, “nervously moving about, feeding, somewhat on the order of bluebirds, lighting on roots of the fallen dead timber or dry standing snags, making short excursions to the snow or wind-swept spots of ground. Before I could get near them they moved off over the ridge, but after reaching the summit of the ridge I built a fire on the leeward side of a small spruce and was

preparing to eat my lunch when I again heard their notes, and in a few seconds they—or possibly others—appeared in sight and one lighted on the root of an upturned dead tree near enough for me to collect it as proof of the unusual observation" (MS).

To those who have worked in the mountains of northern New Mexico this record is intensely interesting, showing that these distinguished northern birds do occasionally cross the Colorado line in winter and may be seen, by rare good fortune, among the lofty peaks of New Mexico.

ADDITIONAL LITERATURE.—RATHBUN, S. F., Auk, XXXVII, 458-460, 1920 (flock of 2,000 in Seattle).

CEDAR WAXWING: *Bombycilla cedrorum* Vieillot

DESCRIPTION.—Length: 6.5-7.5 inches, wing about 3.6-3.9, tail 2.3-2.6. *Adults:* Body, including high crest soft fawn-color, deeper brown on anterior underparts



From Handbook of Western Birds

FIG. 103. Cedar Waxwings
Eating leaf-destroying insects

(chin brown), fading to grayish on rump and upper tail coverts, and becoming yellowish or olive on belly, lower sides, and flanks (belly sometimes nearly white), and under tail coverts white; tail and wings blackish, tail tipped with yellow, primaries tipped with gray, secondaries usually tipped with red tear-shaped wax-like appendages. (In imperfect plumage the wax-like appendages are absent and the yellow tail band nar-

rower and duller.) Forehead and streak through eye, velvety black, narrowly bordered with white. *Young*: Duller, streaked with whitish, and with smaller crest.

COMPARISONS.—(See Bohemian Waxwing, p. 591.)

RANGE.—Breeds mainly in Transition and Upper Austral Zones from southern British Columbia, central Alberta, central Manitoba, northern Ontario, northwestern Quebec, and Nova Scotia south to North Carolina, Kansas, northern New Mexico (?), Arizona, and southern Oregon; winters in most of United States and south to Mexico, Cuba, and Panama. Recorded from southeastern Alaska in July.

STATE RECORDS.—There seems to be no certain record of the breeding of the Cedar Waxwing in New Mexico. A small flock was seen August 11, 1904, at 7,900 feet on the Hondo (Bailey); and a flock June, 1853, at Fort Webster (Henry). All of these were probably wanderers rather than breeders, and this probability is made greater by the fact that there is no sure breeding record in the nearby parts of any of the neighboring States. At the most it is a rather rare bird in New Mexico, wintering and remaining until late in the spring, and returning early in the fall. It has been noted in the State at Arroyo Seco, 8,000 feet, February 2, 1904; Corona, October 23, 1902 (Gaut); Dog Spring, Grant County, May 31, 1892 (Mearns); Shiprock, May 27, 1907 (Gilman); and Rinconada, May 1, 1904 (Surber).—W. W. COOKE.

NEST.—In bushes or low trees, a deep, bulky structure made of twigs, weed stems, grasses, and vegetable fibers, lined with leaves and fine rootlets. *Eggs*: 3 to 6, pale bluish to purplish gray, sharply and usually thickly marked with blackish and paler or lilac shell spots, most thickly about the larger end.

FOOD.—Nine-tenths vegetable matter, almost wholly wild fruits and seeds, as wild cherry, wild currant, chokecherry, and pokeberry; the one-tenth animal matter consisting mainly of insects, including grasshoppers, crickets, crane flies, lace-wings, butterflies, moths, bugs, bark-lice, and scale insects. The Waxwings are fond of leaf-eating beetles, and devour quantities of the Colorado potato beetle and the pernicious elm-leaf beetle (a flock of 30, it is estimated, will eat 90,000 cankerworms a month). "They seem to do little injury to cultivated fruit except to the cherry crop, and most of this usually may be avoided by planting a goodly number of early mulberry trees when planting cherries" (Forbush).

GENERAL HABITS.—The high-crested, exquisitely-tinted Waxwings, which wander about, except during the late nesting season, in close flocks, to light in some berry-bearing bush or tree—as the chokecherry, juniper, or mulberry—whispering softly in sibilant tones among themselves, are occasionally met with in New Mexico. On the Hondo the small flock we saw was among the chokecherry bushes, and about Corona Mr. Gaut saw them feeding on the berries of the soft-leaved juniper (*Juniperus scopulorum*).

It may seem a far cry from New Mexico to the Atlantic Ocean, but it is interesting to know that a young Waxwing in the fall migration once came on board an Atlantic liner at Lat. N. 41° 58', Long. W. 59° 34', and spent the afternoon, coming within a yard of some of the passengers (Butler, A. W., 1926, p. 103).

ADDITIONAL LITERATURE.—FORBUSH, E. H., Educational Leaflet 48, Nat. Assoc. Audubon Soc.—HERRICK, F. H., Home Life of Wild Birds, 11, 17-18, 52-63, 106, 118, 1901.—HUBBARD, Mr. and Mrs. F. D., Bird-Lore, XXVI, 10-11, 1924 (X-ray

showing fracture).—MILLER, O. T., With the Birds in Maine, 196-201, 1904.—POST, K. C., Wilson Bull., XXVIII, 175-193, 1916.—SAUNDERS, A. A., XXVIII, 323-329, 1911.—WHITMAN, F. N., Bird-Lore, XXI, 293-295, 1919.

SILKY FLYCATCHERS: Family Ptilonotidae

The Phainopepla, which is the only one of the family of Silky Flycatchers in the United States, has a slenderer bill than the Waxwings, with nostrils naked, scaled; hind toe very short, wing of ten primaries, and tail long and fan-shaped, of broad feathers, widening to their obtuse ends.

PHAINOPEPLA: *Phainopépla nítens* (Swainson)

DESCRIPTION.—*Length:* 7-7.7 inches, wing 3.6-3.8, tail 3.8-4.1. *Adult male:* Glossy greenish blue-black (less glossy on wings and tail) except for white patch on inner webs of primaries; iris red. *Adult female:* Plain olivaceous mouse-gray, the longer feathers of crest black, edged with gray; wings and tail dusky, faintly glossed with greenish, coverts tipped with gray or white, the primaries with white patch much reduced or absent, under tail coverts broadly margined with white. *Young:* Resembling the adult female, but browner, duller, and with narrower wing margins. Young females in adult dress have the abdomen suffused with whitish, and young males have the body feathers, especially below, edged with grayish, wing coverts edged with white.



From Handbook of Western Birds (Fuentes)

FIG. 104. Phainopeplas
The glossy backed "silken flycatchers,"
eating pink pepper berries

RANGE.—Breeds chiefly in Lower Sonoran Zone from central California, southern Nevada, Arizona, New Mexico, southern Utah, and central-western Texas south to Vera Cruz, Valley of Mexico, and Puebla. Winters locally from central California and southern Arizona south at least to the southern limit of its breeding range.

STATE RECORDS.—The southwestern part of New Mexico is the home of the small numbers of the Phainopepla that occur in the State, and here it is mostly rare and local. Doctor Henry says that in 1853 it arrived at Fort Webster on May 25,

and nested on the Mimbres, but he saw none after July. [It ranges commonly up the Rio Grande to Palomas Hot Springs and Elephant Butte. Fresh eggs were found at Elephant Butte, May 25, 1916 (Ligon, 1916-1918).] Other records are those of one collected July 28, 1892, at Big Spring, Guadalupe Canyon, in extreme southwestern Grant County (Mearns); one seen August 17, 1908, at Silver City (Birdseye); one collected October 6, 1908, at Gila, 4,700 feet (Goldman); and one taken October 20, 1912, 20 miles east of Silver City (Kellogg).—W. W. COOKE.

NEST.—Saucer shaped, saddled on a branch of cottonwood, willow, mesquite, or other trees, or in parasitic plants; made of twigs, plant fibers, stems, blossoms, and

plant down. *Eggs*: 2 or 3, grayish or greenish white, thickly spotted with brown, blackish, or faint lilac.

FOOD.—Mainly berries, notably those of the mistletoe, juniper, and elder, but also many insects, principally ants.

GENERAL HABITS.—The Phainopepla, suggesting a miniature Magpie by reason of his black body, white wing patches, and level flight, is a very different bird; of musical voice, dignified quiet demeanor, and peculiar charm. About the nest the pair have a variety of notes, one, suggesting a young Robin, given by both with a dash of the tail. Those of the male vary from a call suggesting a Meadowlark, a scold and an alarm note—*ca-rack* or *ca-rac-ack*—to a bright vivacious song, whose jumbled notes, flute-like tones, and musical outbursts make it altogether delightful.

For some unexplained reason the male often assumes the duties of the female, building the nest and brooding the eggs, while she flies around with her sisters awaiting the time to care for the young.

In the Huachuca Mountains of Arizona, in July, after the breeding season, Mr. Swarth found that "a movement began from the lower valleys up into the mountains, and during August the Phainopeplas were most numerous throughout the oak region, up to about 5,000 feet. At this time they were in loose straggling flocks of from six to a dozen birds, young and old together, and were generally seen sitting in the tree tops and feeding for the most part, as flycatchers" (1904, p. 48).

ADDITIONAL LITERATURE.—BAILEY, F. M., *Auk*, XIII, 38-43, 1896.—MYERS, H. W., *Condor*, IX, 101-103, 1907; X, 72-75, 1908; XI, 22-23, 1909.—TORREY, BRADFORD, *Nature's Invitation*, 276-280, 1904.

SHRIKES: Family Laniidae

Subfamily Laniinae

The Shrikes have much rounded wings and tail, the wing with ten primaries; the nostrils with dense tufts of bristly feathers, tarsus scaled in front and



From Biological Survey (Fuentes)

FIG. 105. Shrike (*Lanius ludovicianus ludovicianus*)

Impaled grasshoppers put in cold storage for time of need

outside, and the feet large and strong. Carnivorous, feeding on insects and such small birds and quadrupeds as they can capture and overpower, they often impale their prey on thorns or sharp twigs to return to in time of need. In preparing their food they tear it apart with their powerful toothed and hooked bill, the size, shape, and strength of which recalls the bill of a bird of prey. Like other birds that swallow hard, indigestible food, the Shrikes eject it in the form of pellets.

REFERENCE—BEAL, F. E. L., and W. L. McATEE. U. S. Dept. Agr. Farmers' Bull. 506, 1915.

NORTHERN SHRIKE: *Lanius borealis* Vieillot

DESCRIPTION.—*Length*: 9.2–10.7 inches, wing 4.3–4.6, tail 4.5–4.7, bill from nostril .5, tarsus 1. *Adults*: Upperparts light bluish gray, changing to white on forehead, superciliary, posterior scapulars, and upper tail coverts; tail and wings black, outside tail feathers almost wholly white and all the rest (except sometimes middle pair) tipped with white; wings with secondaries tipped with white, and primaries with white patch at base; black spot in front of eye and black streak over ears; underparts white, chest and sides with grayish wavy bars or vermiculations. *Young in juvenal plumage*: Brownish gray above, paler and with wavy markings below; black replaced by dusky or rusty.

RANGE.—Breeds in Hudsonian and locally in Canadian Zone from northwestern Alaska, northern Mackenzie, and northern Quebec south to southern Quebec, southern Ontario, and central Saskatchewan; winters in southeastern Alaska and southward to California, Arizona (rare), New Mexico, Texas, Kentucky, and Virginia.

STATE RECORDS.—During the winter the Northern Shrike comes far enough south to occur as a rare visitor in the northern, and occasionally in the southern, part of New Mexico. It was taken October 23, 1913, near Koehler Junction (Kalmbach); and November 7, 1902, at Tularosa, Otero County (Gaut)—the most southern record for the State. It has also been noted near Socorro, November 14, 1846 (Abert); Chama, December 23, 1893 (Loring); Las Vegas, December 23, 1882 (Batchelder); and February 7, 1902 (Atkins); [near Santa Fe, December 18, 1922 (Jensen)]; Albuquerque, January 5, 1900 (Birtwell); and January 14, 1894 (Loring); Arroyo Seco, 8,000 feet, February 6, 1904 (Surber). Thus it has occurred from 4,500 feet to 8,000 feet and from October 23 to February 7, or during the three coldest months.—W. W. COOKE.

FOOD.—In cold weather, birds and mice 60 per cent; the rest of the year, mainly grasshoppers.

GENERAL HABITS.—From his attempts to imitate the notes of other small birds, the Northern Shrike is sometimes called Mockingbird; his gray, black, and white plumage, though very different from that of the Mocker, at sufficient distance perhaps helping to carry out the analogy. Of his imitations, Nuttall states, "I have lately heard one (November 10th, 1833) employed in a low and soft warble resembling that of the Song Sparrow at the present season, and immediately after his note changed to that of a Catbird. Like that preeminent minstrel, the

Orpheus, he also mounts to the topmost spray of some lofty tree to display his deceptive talent and mislead the small birds so as to bring them within his reach. His attitudes are also light and airy, and his graceful, flowing tail is kept in fantastic motion" (1905, part I, p. 161).

A trap of the bird bander, Mr. Jensen, once attracted a hungry Shrike. When discovered it was fluttering around his trap trying to get at the imprisoned birds, a Junco and a House Finch. When it finally succeeded in entering the trap, although the watchful bander was instantly on the spot, he was too late to save the birds (1923a, p. 333).

But in the Kowak Valley, Alaska, where Doctor Grinnell found the Shrikes in the willow bottoms a terror to the Redpolls, although one of the Redpolls was seen being carried to a nest in a clump of spruces, lemmings and meadow mice were the usual prey of the Shrikes.

WHITE-RUMPED SHRIKE: *Lanius ludovicianus excubitorides* Swainson

DESCRIPTION.—*Length:* 8-10 inches, wing 3.7-4.1, tail 3.7-4.3, bill from nostril .4-.5, tarsus 1-1.1. *Adults:* Upperparts light slate-gray, darkest on head, fading to white on upper tail coverts; tail and wings black, tail feathers (except two middle pairs) broadly tipped with white; wings with outer scapulars and tips of secondaries white; wide eye streak, lores, and nasal tufts wholly black; underparts pure white, very slightly, if at all marked. *Young:* Like adults but general colors less strongly contrasted, washed with brown and narrowly barred, wing coverts tipped with buffy.

RANGE.—Breeds in Transition and Austral Zones from central Alberta, central Saskatchewan, and southern Manitoba south (between western border of Great Basin and eastern border of Great Plains) to central Texas, Durango, and Tepic, and to Lower California; winters south over Mexico to Isthmus of Tehuantepec in Oaxaca.

STATE RECORDS.—Throughout the lower parts of nearly the whole of New Mexico the White-rumped Shrike is found in summer. It breeds regularly and commonly to 6,000 feet at Silver City (Fisher); [commonly on the Pinyon Flats in the Santa Fe region, where fresh eggs are found April 20 to June 1 (Jensen, 1922)]; and frequently seen along Red River and in clumps of willows at a few other points in Colfax County, July 28-October 24, 1913 (Kalmbach); but is more common from about 5,000 feet, as at Santa Rosa, down to the lowest parts of the State at Mesilla (Merrill); and Carlsbad (Bailey). [It was noted between Socorro and Albuquerque August 28, 1917 (Ligon).]

In the fall it ranges somewhat higher to 7,000 feet at Largo Canyon, October 2, 1906 (Bailey); Folsom, 7,000 feet, August, 1903 (Howell); Lake Burford, 7,500 feet, September 30, 1904 (Bailey); and once at Willis, 7,800 feet, in the fall of 1883 (Henshaw).

It winters in southern New Mexico, at Silver City (Marsh); and less commonly north to Albuquerque (Henshaw). On the Carlsbad Bird Reserve it was fairly common in January, 1915, and noted in the winter of 1915-16; [it was rather common in December, 1916, and on the Rio Grande Bird Reserve (Elephant Butte) was noted between November 23 and December 9, 1916 (Willett).] It probably winters also occasionally throughout the warmer parts of northern New Mexico.—W. W. COOKE.

NEST.—In thorn trees, hedges, briars, cactus, and sagebrush; bulky, made variously of sticks, leaves, grass, wool, and feathers, lined with grass stems, weeds, and sometimes hair. *Eggs:* 4 to 6, grayish to yellowish white, spotted with brown and lilac.

FOOD.—Insects, especially grasshoppers, constitute the larger part of its food [July 28–October 24 in Colfax County, 89 per cent grasshoppers (Kalmbach)], though beetles, moths, caterpillars, ants, wasps, and a few spiders also are taken. While it occasionally catches small birds, its principal vertebrate food is small mammals, as field mice, shrews, and moles; and when possible it obtains lizards (Henshaw).

GENERAL HABITS.—The harsh strident note of the White-rumped Shrike often calls attention to a gray and black figure perched on the top of a mesquite on the desert plains, on the tip of a *fouquieria* or *dasyliro* spike in a dry side canyon, or, among the ranches, on a fence, hedgerow, or telegraph pole.

Along the Pecos valley at Roswell and Carlsbad in June, 1899, Mr. Bailey found the Shrikes common, going about in families, the young being noticeable from their clouded plumage. Although when a few miles from Tucumcari, on June 17, 1903, Mr. Surber saw several wandering families, about twenty birds altogether, a week later, near the Concho, we saw a belated Shrike fly to her nest in the top of a low *Forsteria* tree. Two were seen, September 1, on telegraph poles, good lookouts and favorite perches, between Las Vegas and Mora. A specimen was taken in immature plumage September 30, and its well-filled stomach contained mainly beetles and grasshoppers.

From Mesilla Park, Professor Merrill writes: "The White-rumped Shrike is an always noisy resident, rivalling the Cactus Wren in clamor. He is always picking on some other bird, be it large or small; he even fights excessively with his own kind. The nest is made in April in various trees, the more thorny the better. Yuccas and big mesquites afford good places. As in the east, he delights in osage orange hedges as nesting sites. For food he eats many insects, grasshoppers, big beetles, lizards (including horned lizards), mice, young birds, and birds' eggs. I have found numbers of remains of horned lizards and others, with mice skulls, impaled upon yucca points. The most daring deed of this feathered thug I have ever witnessed was a cold-blooded assault to kill made upon a male Cooper Tanager. Pouncing suddenly upon the Tanager, which was seated upon a fence wire, the Shrike knocked it limp with one peck, then picked it up in his claws and started to fly away with it. I frightened him until he dropped his prey but received from him a vociferous protest" (MS).

After seeing a Shrike near the Santa Clara Pueblo, October 16, 1904, Mr. Gaut found the dried carcass of a Sonora white-footed mouse hanging on a barbed wire fence.

Interesting testimony regarding the use of impaled prey comes from J. R. Watson, of the University of New Mexico. He says: "The Shrike . . . in the vicinity of Albuquerque . . . feeds, during the late fall and winter, quite freely on the lizards (*Uta stans-*

buriana and *Holbrookia maculata*) which usually are about in some numbers during the warmer hours of an average winter day. These the Shrike impales on thorns, etc., according to its usual custom with small birds and grasshoppers. But the month of December, 1909, was unusually cold and the lizards did not appear. When riding over the mesa, in early January, I both saw and heard a Shrike, perched on a desert willow (*Chilopsis*), feeding on some dry hard substance. Examination showed that the food was the extremely dry bodies of some lizards that had all the appearance of having been placed there several weeks before. The ground about was strewn with fragments and there were still many on the thorn-like branches of the *Chilopsis*. It was the noise the bird made in his attempt to break up this material that first attracted my attention. It is well to observe that in our dry atmosphere such an impaled animal does not decay as it would in a more humid climate but cures perfectly. In fact, the native people regularly dry pieces of meat for future use by fastening it to the clothesline, where it is exposed to the almost tropical sun and desert wind" (1910, p. 459).

ADDITIONAL LITERATURE.—JUDD, S. D., Biol. Surv., U. S. Dept. Agr., Bull. 9, 1898.—MILLER, O. T., Upon the Tree-Tops, 50-60, 1897.

VIREOS: Family Vireonidae

Subfamily Vireoninae

The small Vireos or Greenlets are peculiar to America. Their bill is a miniature of that of the Shrike, being distinctly toothed and notched at tip; the nostrils are exposed, overhung with a scale, the rictal bristles conspicuous, the toes extensively coherent at base, claws much curved, and the wing at least as long as the tail, of ten primaries. They are for the most part arboreal, though some prefer undergrowth, their dull, greenish coloration making them inconspicuous. Their movements are slow as they hunt carefully over the under-surfaces of leaves for small caterpillars and other insects. Their nests are cup-shaped, hung from forked twigs.

COMPARISONS.—Of the six Vireos found in New Mexico, one, the *Western Warbling*, has a distinctive long, white eye-streak; two, the *Cassin* and the *Plumbeous*, have a broad white orbital ring and loreal streak which contrast strikingly with the gray of the head, while the back is olive-green in the *Cassin* and gray in the *Plumbeous*. Of the three remaining Vireos, the *Gray* can be known by the plain dull gray of the upperparts and sides of head, and only one indistinct wing bar; the *Stephens* by the olive-gray of its upperparts and its two wing bars; the *Arizona Least* by its brownish gray upperparts.

If, however, there is any doubt about the identification of these smaller vireos, specimens should be sent to a museum or to the Biological Survey for comparison with series of skins.

REFERENCE.—CHAPIN, E. A., U. S. Dept. Agr. Bull. 1355, 1925 (food habits).

Subgenus Vireo

STEPHENS VIREO: *Vireo huttoni stéphensi* Brewster

DESCRIPTION.—*Length:* 4.9–5.2 inches, wing 2.5–2.6, tail 2.1–2.2, bill from nostril .2–.3, tarsus 1. *Adults:* Upperparts dull olive-gray becoming dull olive-green on rump; wings and tail dusky brownish gray with grayish and yellowish edgings; wings with two white bars; broad orbital ring and streak over lores, yellowish white; underparts dull yellowish white, shaded anteriorly with buffy. *Young:* Similar, but grayer above, and paler below.

RANGE.—In summer, mountains of southern Arizona, southwestern New Mexico and western Texas south to Tamaulipas and Durango; in winter south to southern Mexico.

STATE RECORDS.—The type specimen of the Stephens Vireo was secured in the Chiricahua Mountains of Arizona close to the New Mexico boundary on March 14, 1881, and the statement is also made that eggs of this subspecies had been taken in 1876 at Fort Bayard (Stephens, in Brewster, 1882, p. 143). If this statement is correct, then either its occurrence there was accidental or it is an exceedingly rare inhabitant of that district, for there is probably no other place in New Mexico the bird life of which has been so thoroughly studied and by so many different collectors as the region around Silver City, and no one has found this form of vireo there since Stephens visited the place in 1876. During the summer of 1908, July 30–August 6, it was found in the Animas Mountains from 5,800 feet on Indian Creek to 8,100 feet near the top of Animas Peak (Goldman).—W. W. COOKE.

NEST.—(One, described by F. C. Willard.) About 12 feet from the ground, hung in oak brush; yellowish, "composed of a framework of fine grass holding together a thick mat of oak down almost as compact as felt. The prongs of the fork are entirely covered with the down held on by cobwebs. There is a scanty lining of fine grass tops" (the seed removed). *Eggs:* 4, white, spotted with brown.

GENERAL HABITS.—Mr. Willard, who has photographed the beautiful nest of the Stephens Vireo in the Huachuca Mountains, says that, in speaking of the bird, "the first thought is always of its song, if it can be dignified by such a name. It is like the mewling of a very small and lonely kitten repeated with even more energy, frequency and persistence. At times the 'me-ow' is made more heart-rending, like a kitten in distress, the interval being slightly longer but the 'me-ow' more drawn out and fuller in volume. The male will keep this up for minutes at a time, never pausing for breath. One was so persistent I timed him. This series lasted thirteen and one-half minutes at the rate of one every second. This seems incredible, but was actually timed by a watch. He sat still on the top of a madrone tree most of the time. The cadence scarcely varied at all. Twice he hopped to another perch, but did not let the movement interrupt his song. The female does not have the same note, but is restricted to the usual scolding note of the vireos and a peculiar chirp which I am unable to describe and which she shares in common with the male. This last note was heard only around the nest or when feeding the young" (1908, p. 232).

Like other vireos, the Stephens is very tame, and the brooding female watched by Mr. Willard did not leave the nest until touched.

GRAY VIREO: *Vireo vicinior* Coues

DESCRIPTION.—*Length:* About 5.6–5.7 inches, wing 2.5–2.6, tail 2.4–2.5, tarsus .7–.8. *Adults:* Upperparts and cheeks dull gray, faintly tinged with olive-green on rump; tail and wings dusky, with light edgings, outside tail feather margined with white (except in worn plumage), wings with one indistinct grayish band; lores and orbital ring white; underparts dull white, throat and chest tinged with gray, sides and flanks tinged with olive; white of belly faintly tinged with sulphur-yellow in fresh plumage; under mandible bluish gray. *Young:* Texture of plumage looser and much softer than in adults; gray of upperparts slightly more brownish, white of underparts purer, and wing and tail edgings tinged with olive.

RANGE.—Southern California, southern Nevada, Grand Canyon of the Colorado, Arizona, and southeastern Colorado south to Durango and Lower California.

STATE RECORDS.—A breeding colony of the Gray Vireo was found and one taken on June 14, 1903, on Pajarito Creek near Montoya, 4,300 feet (Bailey). There is no other nesting place known within 200 miles in any direction, and its presence there is unexplained. The species occurs regularly in southwestern New Mexico, breeding at Silver City June 28–July 2, 1894 (Fisher); and Carlisle (Barrell); a few having been seen in summer at Apache (Anthony).—W. W. COOKE.

NEST.—In thorny bushes or trees, 4 to 6 feet from the ground, occasionally supported underneath or on sides; made sometimes of mesquite bark and loosely woven coarse grass, lined with fine grass, but also made of plant fibers, spider web, and cocoons, lined with long vegetable fibers and decorated with sagebrush leaves. *Eggs:* 3 or 4, white, sparsely marked with minute dark brown dots, chiefly around larger end.

GENERAL HABITS.—The Gray Vireo was seen by us at Cuervo and was one of the commonest birds found at Montoya. We discovered two nests there. One had young, and the other was being brooded so closely that I was able to ride up beside the tree and, leaning from the saddle, actually stroke the little sitter's head without driving her away from the nest. Such experiences have come to many workers among the trustful tribe of Vireos, it is true, but when most birds from generations of unhappy experiences fly in terror at our approach, they are none the less heartening to remember.

In their California home in the San Jacinto Mountains, the Gray Vireos were found by Grinnell and Swarth preeminently birds of dry chaparral, thus conflicting in range with no other vireo. They foraged through scrub oak, manzanita, and ceanothus, occasionally into sagebrush. Here, they say, "a person may follow a bird around for twenty minutes, keeping track of it by its oft-repeated song, without catching a view of it above the level of the chaparral tops . . . The song . . . is loud and full-toned, in volume and quality" (1913, p. 293).

ARIZONA LEAST VIREO: *Vireo belli arizonae* Ridgway

DESCRIPTION.—*Adult male:* Length (skins) 4.2 inches, wing 2.2, tail 2. *Adults:* Head, hind-neck, back, and shoulders brownish gray; underparts white, sides faintly

washed with grayish olive-yellow. *Young*: Upperparts pinkish gray and pinkish drab; underparts pure white, sides and flanks tinged with pale yellowish.

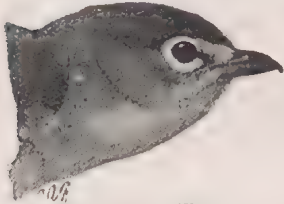
RANGE.—Breeds along the Lower Colorado in California, in Arizona, to central-western Texas and south to Chihuahua, Sonora, and Sinaloa.

STATE RECORDS.—The Arizona Least Vireo has been taken at Fort Bowie, Arizona, just to the west of the New Mexico line, while in Texas it has been collected at El Paso, and in New Mexico it was taken on the Gila River, May 29, 1876 (Stephens).—W. W. COOKE.

Subgenus *Lanivireo*

CASSIN VIREO: *Vireo solitarius cassinii* Xantus

DESCRIPTION.—*Length*: 5-5.6 inches, wing 2.8-3, tail 2.1-2.3, bill from nostril .3, tarsus .7-.8. *Adult male*: Top and sides of head dark gray in sharp contrast to white of loreal streak, orbital ring, and throat; back and scapulars dull olive-green, brighter on rump; tail and wings slaty, with light olive-green edgings, more yellowish on tail feathers, of which the outside ones have the outer web white; wings with two distinct bands; underparts white, shaded with olive and yellow on sides; under mandible bluish gray, with black tip. *Adult female*: Similar but duller, head and neck browner gray, white of underparts less pure. *Young in juvenal plumage*: Wings and tail as in adults, rest of upperparts brownish gray, under parts dull white, flanks tinged with yellowish.



From Handbook of Western Birds

FIG. 106. Cassin Vireo

COMPARISONS.—See Plumbeous Vireo, p. 603.

RANGE.—Breeds in Transition Zone from southern British Columbia, southwestern Alberta, and northwestern Montana south through California to San Pedro Martir Mountains, Lower California; eastward in migration through Arizona and New Mexico (casual in Colorado); winters in Mexico south to Oaxaca and Chiapas.

STATE RECORDS.—Breeding to the northwest and southwest of New Mexico, the Cassin Vireo comes southeast in fall migration and passes through the State on its way to its Mexican winter home. It arrived on September 2, 1883, at Willis, 7,800 feet (Henshaw), and was numerous. It enters the State, however, somewhat earlier, for one was taken, August 7, 1908, at 6,600 feet in the Animas Mountains (Goldman). The most eastern record is that of the specimen taken on August 27, 1903, at the base of Emery Peak near Folsom, a second one being taken September 11, 1903, close to the Colorado line near Bear Canyon (Howell). It is a tolerably common fall migrant at Apache (Anthony); and the last was taken near there on September 25, 1893, on the west side of the San Luis Mountains (Mearns). [In the spring of 1919, one was seen 35 miles southwest of Chloride at 7,000 feet, April 24, and one at Chloride, April 26 (Ligon).]

NEST.—Usually 8 to 20 feet from the ground, hung in oaks, cottonwoods, maples, alders, dogwoods, manzanitas, buck brush, and also in conifers; compactly woven with shreds of inner bark, grasses, and bits of plant down, lined with fine grass stems, and decorated with pieces of white cocoon, and sometimes paper and string, bound with web. *Eggs*: 4 or 5, white, sparsely marked with smallish spots of brown.

FOOD.—Nearly 98 per cent animal matter, about half being bugs—squash-bugs, leaf-bugs, stink-bugs, shield-bugs, leaf hoppers, tree hoppers, jumping plant lice, and black olive scale. Caterpillars and a few moths make up more than 23 per cent of

the food and are eaten in every month. Wasps and a few ants amount to 7 per cent. Ladybird beetles amount to less than 6 per cent. Most of the insects eaten are harmful.

GENERAL HABITS.—Readily distinguished from the Western Warbling Vireo by its white eye-ring, loral streak, and wing bars, the Cassin Vireo is found mainly near water. Its song is louder and more striking and not so continuous as that of the Vireo.

ADDITIONAL LITERATURE.—FINLEY, W. L., Condor, V, 61-64, 1903.—HEAD, ANNA, Condor, VIII, 149, 1906.

PLUMBEOUS VIREO: *Vireo solitarius plumbeus* Coues

DESCRIPTION.—*Length*: 5.7-6.1 inches, wing 3-3.3, tail 2.3-2.5, bill from nostril .3, tarsus .7-.8. *Adults*: Upperparts slate-gray, in sharp contrast to white or loral streak, orbital ring, and throat; rump tinged with olive-green; tail and wings slate-black, with olive-gray edgings, these becoming white on lateral tail feathers, the outside ones with outer web white; wings with two conspicuous white bands; underparts white, sides and flanks broadly but indistinctly striped with grayish olive and pale yellow; under mandible bluish gray. *Young*: Similar to adults but upperparts brownish gray, sides and flanks white.

COMPARISONS.—The practical absence of green—*uniformly gray*—head and back distinguish the Plumbeous from the Cassin Vireo. (See p. 602.)

RANGE.—Breeds in Upper Sonoran Zone of southern Rocky Mountain region from northern Nevada, northern Utah, southern Montana, and southwestern South Dakota south through southwestern Texas, New Mexico, and Arizona to Chihuahua and mountains of Vera Cruz; winters south to Oaxaca and Colima. Recorded in California.

STATE RECORDS.—The breeding Solitary Vireo of New Mexico belongs to the form called *plumbeus*; it breeds in the western part of the State from above 8,000 feet in the coldest part of the Zuni Mountains (Goldman), to 7,000 feet among the junipers in a hot canyon at Fort Wingate (Hollister), and to 6,900 feet at Nutrias (Henshaw). [It was common at Lake Burford, 7,700 feet, after May 26, 1918 (Wetmore). In northern Santa Fe County it is locally common. Ten miles southeast of Santa Fe a nest with fresh eggs was found, May 31, 1920, at 7,500 feet (Jensen).] In eastern New Mexico it breeds at 7,500 feet at Glorieta and Canonicito (Bailey); 7,800 feet at Willis (Birtwell); and 7,500 feet on Mesa Yegua (Bailey). [On Mount Taylor at 7,000 feet, June 24, 1916, four well feathered young were found in the nest. At Chloride, May 17, 1916, fresh eggs and half-made nests, and on June 2, 1916, three fresh eggs were found at 6,200 feet (Ligon).] It was common, breeding on the southwest slope of the Capitan Mountains, July 9, 1903 (Gaut); was feeding young August 1, 1901, at 6,000 feet in the Guadalupe Mountains (Bailey); and undoubtedly nests in the San Luis Mountains, where a specimen was taken July 5, 1892 (Mearns).

In the fall it was found, August 14, 1904, at 8,000 feet near Arroyo Hondo (Gaut); Lake La Jara, 7,500 feet, September 18, 1904; and 10 miles south of Mora, at 7,300 feet, September 4, 1903 (Bailey). It was found as late as September 28, 1883, at Willis (Henshaw); at Apache to September 30 (Anthony); and was taken on the late date of October 9, 1903, in the Manzano Mountains (Gaut).

On the return in spring one was seen at Chloride, April 26, 1915 (Ligon), and another at Silver City, May 13, 1884 (Marsh).—W. W. COOKE.

NEST.—Hung often in dwarf walnut trees, but also box elder, ash, maple, sycamore, pine, and other trees; made of inner bark and vegetable fibers, lined with fine grass stems, rootlets, and plant down; decorated with cocoon cases, web, plant blossoms, and sometimes feathers. *Eggs*: Often 4, white, lightly spotted around the larger end with black and brown.

FOOD.—Mostly caterpillars. One stomach was full of caterpillars, including small green ones, medium sized red ones, and large hairy ones (Bailey).

GENERAL HABITS.—The attractive Plumbeous Vireo, whose white loreal streak and eye ring contrast strongly with its slaty gray plumage, and whose gray Quaker garb harmonizes with its sweet rich voice and quiet ways, was heard from among the junipers, oaks, and yellow pines of the canyons of the Guadalupe Mountains in August. At Lake La Jara it was singing loudly in the yellow pines about our camp as late as September 18, and the next day the same loud, rich notes were heard in the pine woods a few miles beyond.

At Lake Burford, in 1918, when Doctor Wetmore found them common among the yellow pines, by May 26 the males were in full song, one of them "carrying a bit of nesting material about with him and singing at the same time . . . They continued in full song until the middle of June." Close family relationships were suggested. Some of the call notes recalled the chattering calls of the Yellow-throated Vireo, while many notes introduced into the song were similar to some of the phrasing used by the White-eyed Vireo. In the Zuni Mountains, where Major Goldman found the Plumbeous rather common in the higher areas on north slopes and they sang from the tops of tall trees, their loud song suggested that of the Yellow-green Vireo of Mexico and South America.

At Chloride, in May, 1916, Mr. Ligon became greatly interested in a pair that had made their nest about twelve feet from the ground at the end of a long limb of a large box elder opposite his cabin. He says that the male spent "most of his time singing, even while on the nest. The nest was not being constantly occupied at this time, but at least half of the time one of the birds was on the eggs. Generally when the female would leave she would fly into the tree where her mate sang and twittered about as she hunted food. He would then fly directly to the nest, get in it and sing lovingly. When she would come back he would turn the nest over to her, and I noticed that he would grow impatient at times and leave the nest before she came." On the evening of the fourteenth the nest contained three fresh eggs. "On the morning of the sixteenth I had seen three Cowbirds, two males and one female, flying about the village. I thought at the time that they were hunting nests. About 8 a. m., while writing in the cabin, I heard the Cowbirds in the tree, and when I went out I found the female and one male Cowbird on the ground eating two of the little

eggs. The other male was sitting on the edge of the nest. I ran them away and found that the nest contained but one egg. I am of the opinion that these eggs were destroyed to make room for an egg of the Cowbird, although she failed to lay in the nest that day. I did not see the Vireos about until the next morning, and I expect they will abandon the nest" (MS).

In the Huachuca Mountains in Arizona, where Mr. Willard found the birds nesting commonly from 4,000 to 9,000 feet in the canyons and on the ridges, he had an interesting experience illustrating the remarkable tameness of the vireo family. He says, "Both parents are very brave when on the nest, the male more so than the female. A nest was found May 31, 1907. It was forty feet up in a maple, one of the few instances where the nest was placed well up from the ground. The female sat close as I worked with my rope trying to get within reach. Just as I was about to reach the nest the male flew down and the female relinquished her guard to him. He pecked my finger as I reached out, and settled down close into the nest. I poked him but he refused to leave and sat with mouth wide open ready to repel the invader. I tried slipping my finger under him, but he did not budge. Then I took him by both sides of his open beak and lifted, but he hung onto the bottom of the nest with his feet. Non-plused, I desisted for a few moments, debating how to get a view of the contents of the nest. While doing this he decided that he had done enough, hopped off, and flew into a neighboring tree. He deserved his treasures, so, after one peep at the three eggs, I untied my ropes and descended" (1908, p. 231).

Subgenus *Vireosylva*

WESTERN WARBLING VIREO: *Vireo gilva swainsoni* Baird

DESCRIPTION.—Length: 4.7–5.4 inches, wing 2.5–2.8, tail 2–2.3, bill from nostril .3, tarsus .6–.7. Adults: Upperparts dull olive-gray, back more olivaceous, tail and wings brownish gray with pale edgings, inner webs of feathers edged with white; long stripe over eye, grayish, median underparts usually white, sides shaded with olivaceous. Young in juvenal plumage: Upperparts largely buffy grayish, wings with one indistinct brownish or olivaceous band; eye streak dull whitish; underparts dull white medially, olive or yellowish on sides and flanks.

RANGE.—Breeds in Canadian, Transition, and Upper Austral Zones from northern British Columbia, southwestern Mackenzie, and northeastern Alberta south to northwestern Nebraska, western Texas, Arizona, New Mexico, northern Sonora, and southern Lower California; winters south to Guatemala.

STATE RECORDS.—During its New Mexico breeding season the Western Warbling Vireo is confined to the mountains, ranging across the State north and south and occurring east to the Sacramento Mountains—Cloudercroft, July 17, 1901 (Fuertes); Capitan Mountains, July and August, 1903 (Gaut); Glorieta, 7,500 feet; common July 7–10, 1903, in Sangre de Cristo Mountains in the Pecos and Taos regions (Bailey); [June–July, 1919, rather common over the entire Sangre de Cristo Range,

especially in the aspens of the divides, at about 10,000 feet (Ligon); fresh eggs, June 1-15 (Jensen, 1922)]. It breeds as low as 7,000 feet at Santa Fe (Bailey), to 6,000 feet near Silver City (Henry), and to 5,000 feet at Shiprock (Gilman). [In the Black Range, June 25, 1920, a nest containing two fresh eggs was found 6 miles southwest of Chloride at 6,500 feet; and July 4, young out of the nest were seen in



MAP 53. WESTERN WARBLING VIREO
Triangles mark breeding and probable breeding records

Black Canyon, 32 miles southwest of Chloride, at 7,200 feet (Ligon). At Lake Burford, 7,700 feet, June 2, 1918, a partly made nest was found (Wetmore).] Young out of the nest were being fed at 10,700 feet near Twining August 4, 1904, and a specimen was taken at 11,000 feet below Pecos Baldy August 3, 1903 (Bailey). [It was common on the Rio Grande (Ligon, 1916-1918).]

Wintering south of the United States, it deserts New Mexico early in the fall, the bulk leaving the latter part of August, at which time, August 25, 1904, the species was noted at 9,000 feet in the Culebra Mountains (Gaut); on Santa Clara Creek in the Jemez Mountains August 24-25, 1906 (Bailey); at Willis, 7,800 feet,

September 1, 1883 (Henshaw); near the summit of the San Francisco Mountains, September 3, 1908, at 8,600 feet (Birdseye); and at Albuquerque, September 7, 1900 (Birtwell). Two late birds were seen, September 20, 1908, in the Burro Mountains at 6,500 feet (Goldman); and a single specimen, September 25, 1889, at Cooney (Barrell).

In the spring the first arrival was noted at Silver City the first week in May (Hunn). One noted the first of June, 1907, at Deming (Bailey), was probably a delayed migrant rather than a local breeder; and one taken May 31, 1892, a little south of there, at Dog Spring, Grant County, 4,800 feet (Mearns), was probably also a migrant, for this is the latest date any were taken, though collections were made there until the middle of June.—W. W. COOKE.

NEST.—Hung from a forked twig of an aspen or other deciduous tree, or bush; cup-shaped, and smooth; made of vegetable fibers and bleached grasses, bound together with spider web and lined with fine grass stems. *Eggs*: 4 or 5, white, spotted around larger end with reddish, dark brown, and lilac.

FOOD.—Insects and a few spiders make up over 97 per cent, caterpillars, moths, etc., amounting to nearly half the total food. In April they amount to 82 per cent of the food of the month. Among the other insects eaten are pupae of codling moths, stink bugs, leaf bugs, leaf hoppers, spittle insects, tree hoppers, black olive scale, and harmful beetles. Beneficial California ladybirds are largely eaten when unusually common, but injurious insects make up the greater part of the food.

GENERAL HABITS.—The leaf-tinted Western Warbling Vireo, whose warbling song is a pleasantly familiar sound in open sunny woods in the West, was found by Doctor Wetmore at Lake Burford in thickets lining gulches and among groves of aspen, one pair nesting in a choke-cherry early in June.

On the Pecos, at 8,000 feet, about July 15, we found the Vireos singing and carrying food. They were seen, a month later, at the same altitude on Mora Creek and also found in the poplars on the mesa above at 10,300 feet. Between Twining and Amizett on August 4, 1904, "this friendly little associate who is an almost constant warbler," as Mr. Ligon says, was still singing and a pair were feeding a late family of young out of the nest. High up in the Capitan Mountains during July and August, 1903, Mr. Gaut found them probably the most numerous of the smaller birds. He says, that "some could always be found feeding about the balsams and spruces." In the Burro Mountains at least two were seen by Major Goldman the middle of September, 1908, feeding on wild grapes in a northeast slope canyon at 6,500 feet.

Although, as Mr. Henshaw says, the Western Warbling Vireo "often finds its home in the gardens and streets of the towns, thus exhibiting the same traits of confiding familiarity which attach to it in the east, it is . . . equally numerous in the wild uncultivated districts where man has not yet penetrated. It frequents, for the most part, the deciduous trees, especially the cottonwoods, and ranges from the valleys high up into the mountains . . . and is almost

as strongly represented numerically at 10,000 feet as at a lower altitude. Its habits are everywhere the same, and the sweet, half meditative notes of its beautiful song have the same power to charm the ear in the solitude of its wild home as when heard under the more familiar conditions of civilization" (1875, pp. 221-222).

ADDITIONAL LITERATURE.—FINLEY, W. L., Condor, V, 61-64, 1903.—RUST, H. J., Condor, XXII, 85-94, 1920.

WOOD WARBLERS: Family Mniotiltidae

The Wood Warblers, next to the Finches and Sparrows the largest family of North American birds, with one or two exceptions are small birds, hardly averaging over five inches in length. They have only nine primaries, and the bill, which varies greatly, is usually an elongated cone. It is never strongly hooked or toothed at the end as in the Shrikes and Vireos, nor greatly flattened with gape reaching to eyes as in the Swallows. In *Vermivora* the bill is slender and very acute, unnotched and unbristled; in *Dendroica* it lacks the extreme acuteness, is notched near the tip and has rictal bristles, while the tail always has white (or yellow) blotches; in *Seiurus*, *Oporornis*, and *Geothlypis* the wings and tail are without blotches; in *Icteria* the bill is stout and high at base, curved, unnotched, and unbristled; in *Wilsonia* the bill is broad and depressed at base, rictal bristles developed; in *Setophaga* the bill is broad and flat, with long rictal bristles, and the tail is long and fan-shaped. As the warblers feed mainly upon insects, they are highly migratory, often flying thousands of miles from their summer to their winter home; and, as they migrate by night, great numbers are killed by striking against lighthouses and electric-light towers.

With few exceptions, they are beautifully clothed in variegated colors, but the sexes are unlike, and the changes of plumage with age and season of the year are so strongly marked that great care must be taken in identifying the females and young (Coues).

REFERENCES.—CHAPMAN, F. M., The Warblers of North America, 1907.—COOKE, W. W., Biol. Surv., U. S. Dept., Agr. Bull. 18, 1904 (distribution and migration).

[GOLDEN-WINGED WARBLER: *Vermivora chrysóptera* (Linnaeus)]

DESCRIPTION.—*Length*: About 4.2-4.6 inches; wing 2.4-2.6; tail 1.7-1.8; bill .4, tarsus .7. *Adult male in spring and summer*: Top of head and conspicuous patch on wing, bright yellow; rest of upper parts, including middle pair of tail feathers, bluish gray, tail and wings (except middle tail feathers) blackish, edged with gray; inner webs of three outer tail feathers extensively white; throat black and wide black eye streak between white streaks; median underparts white, sides gray. *Adult male in winter*: Similar, but yellow of crown and gray of back more or less obscured by olive-green feather tips; bill brownish instead of black. *Adult female*: Similar to male but duller, black of head replaced by gray, and upperparts and sides usually tinged with green.



SONORA YELLOW WARBLER

GRACE WARBLER

LONG-TAILED CHAT

ROCKY MOUNTAIN ORANGE-CROWNED WARBLER

VIRGINIA WARBLER

GRINNELL WATER-THRUSH

as strongly represented numerically at 10,000 feet as at a lower altitude. Its habits are everywhere the same, and the sweet, half meditative notes of its beautiful song have the same power to charm the ear in the solitude of its wild home as when heard under the more familiar conditions of civilization" (1875, pp. 221-222).

ADDITIONAL LITERATURE.—FINLEY, W. L., Condor, V, 61-64, 1903.—RUST, H. J., Condor, XXII, 85-94, 1920.

WOOD WARBLERS: Family Mnioiltidae

The Wood Warblers, next to the Finches and Sparrows the largest family of North American birds, with one or two exceptions are small birds, hardly averaging over five inches in length. They have only nine primaries, and the bill, which varies greatly, is usually an elongated cone. It is never strongly hooked or toothed at the end as in the Shrikes and Vireos, nor greatly flattened with gape reaching to eyes as in the Swallows. In *Vermivora* the bill is slender and very acute, unnotched and unbristled; in *Dendroica* it lacks the extreme acuteness, is notched near the tip and has rictal bristles, while the tail always has white (or yellow) blotches; in *Seiurus*, *Oporornis*, and *Geothlypis* the wings and tail are without blotches; in *Icteria* the bill is stout and high at base, curved, unnotched, and unbristled; in *Wilsonia* the bill is broad and depressed at base, rictal bristles developed; in *Setophaga* the bill is broad and flat, with long rictal bristles, and the tail is long and fan-shaped. As the warblers feed mainly upon insects, they are highly migratory, often flying thousands of miles from their summer to their winter home; and, as they migrate by night, great numbers are killed by striking against lighthouses and electric-light towers.

With few exceptions, they are beautifully clothed in variegated colors, but the sexes are unlike, and the changes of plumage with age and season of the year are so strongly marked that great care must be taken in identifying the females and young (Coues).

REFERENCES.—CHAPMAN, F. M., The Warblers of North America, 1907.—COOKE, W. W., Biol. Surv., U. S. Dept., Agr. Bull. 18, 1904 (distribution and migration).

[GOLDEN-WINGED WARBLER: *Vermivora chrysóptera* (Linnaeus)]

DESCRIPTION.—Length: About 4.2-4.6 inches; wing 2.4-2.6; tail 1.7-1.8; bill .4, tarsus .7. Adult male in spring and summer: Top of head and conspicuous patch on wing, bright yellow; rest of upper parts, including middle pair of tail feathers, bluish gray, tail and wings (except middle tail feathers) blackish, edged with gray; inner webs of three outer tail feathers extensively white; throat black and wide black eye streak between white streaks; median underparts white, sides gray. Adult male in winter: Similar, but yellow of crown and gray of back more or less obscured by olive-green feather tips; bill brownish instead of black. Adult female: Similar to male but duller, black of head replaced by gray, and upperparts and sides usually tinged with green.



SONORA YELLOW WARBLER

GRACE WARBLER

LONG-TAILED CHAT

ROCKY MOUNTAIN ORANGE-CROWNED WARBLER

VIRGINIA WARBLER

GRINNELL WATER-THRUSH

Young: Upperparts plain grayish olive, brighter on rump; wings with two narrow yellowish bands, sides of head light olive, with whitish or yellowish streaks.

RANGE.—Breeds from central Minnesota, southern Ontario, and Massachusetts south to northern Georgia, northern Indiana, and southern Iowa; winters from Guatemala to Colombia and casually in southern Mexico.]

STATE RECORDS.—A single specimen of the Golden-winged Warbler is said by Doctor Henry to have been seen in April, 1854, at Fort Thorn. This is the only record of the species for the State. Although the markings of the birds are so pronounced that there is little chance that so good an ornithologist as Doctor Henry could have been mistaken in his identification, we must consider it a doubtful record for the State.—W. W. COOKE.]

LUCY WARBLER: *Vermivora lúciae* (J. G. Cooper)

DESCRIPTION.—*Male:* Length (skins) 3.6–4 inches, wing 2.2–2.3, tail 1.6–1.7, culmen .3–.4, tarsus .6. *Female:* Length (skins) 3.6–3.7 inches, wing 2–2.1, tail 1.5–1.6, culmen .3, tarsus .6. *Adults:* Crown and upper tail coverts brown, rest of upperparts gray, outer tail feathers marked with white; lores, orbital ring, and entire underparts white, more or less tinged with buff. In fall, crown patch concealed by gray tips to feathers. *Young:* Without crown patch, upper tail coverts buffy, and wings with two bars.

RANGE.—Breeds mainly in Lower Sonoran Zone from Santa Clara Valley, Utah, south through Arizona; winters in western Mexico south to Jalisco.

STATE RECORD.—A single specimen of the Lucy Warbler was taken on May 19, 1907, at Shiprock (Gilman). The species summers in western Arizona, and the bird above mentioned had wandered more than 200 miles from the nearest part of its regular range.—W. W. COOKE.

VIRGINIA WARBLER: *Vermivora virginiae* (Baird)

PLATE 64

DESCRIPTION.—*Male:* Length (skins) 4–4.3 inches; wing 2.4; culmen .4; tarsus .6–.7. *Female:* Length (skins) 4 inches; wing 2.2–2.3; tail 1.8–1.9; bill .3; tarsus .7. Bill slender and very acute, unnotched, and unbristled. *Adult male in spring and summer:* Crown with chestnut patch, feathers tipped with gray (except in worn plumage), rest of upperparts gray except for greenish yellow rump and upper and lower tail coverts; eye-ring white, conspicuous; underparts dull white with chest patch and usually throat, yellow. *Adult male in fall and winter:* Similar to summer male but upperparts and flanks strongly tinged with brown, yellow of chest duller, and brown crown patch concealed by broad gray tips to feathers. *Young in juvenal plumage:* Upperparts, breast and sides grayish brown, with whitish throat and belly, wings with two buffy bands, tail coverts like adults.

COMPARISONS.—The yellow of both upper and lower tail coverts is distinctive in all plumages.

RANGE.—Breeds in Transition Zone from Nevada, Utah, and northern Colorado south to northeastern New Mexico and high mountain ranges of Arizona; winters in Mexico to Guerrero.

STATE RECORDS.—A specimen taken in the fall of 1858 at Fort Burgwyn by Dr. W. W. Anderson served as the type from which Baird described the Virginia Warbler, naming it after Doctor Anderson's wife.

In the breeding season, it was taken July 11, 1903, at Glorieta, 7,500 feet (Bailey), and was probably breeding not far distant. [On June 29, 1928, a breeding male was

taken on the east slope of the Sandia Mountains, at about 7,500 feet, about 15 miles northeast of Albuquerque. The birds were quite numerous in that locality at the time (Ligon). At Lake Burford it was common May 23 to June 19, 1918, and an incubating female was taken on June 16 (Wetmore).]

All other records are in migration. In the fall migration it has been noted August 3, 1908, on Animas Peak at 7,500 and 8,000 feet (Birdseye); August 13, 1904, Arroyo Hondo, 8,000 feet (Gaut); August 15, 1904, fully grown young in autumn plumage near Questa, 8,100 feet (Bailey); August 20, 1903, in the pines on Sierra Grande (Howell); one August 23, 1886, at Apache, 5,000 feet (Anthony); a few about September 6, 1908, in the Florida Mountains at 5,200 feet, and two, September 11, 1909, in the San Mateo Mountains near the lower part of Monica Canyon (Goldman); one taken and three seen September 11, 1913, in foothills, Colfax County (Kalmbach); noted September 15, 1874, Tierra Amarilla (Henshaw); and September 16, 1899, Albuquerque (Birtwell).

In spring the first were noted at Cooney April 10, 1889 (Barrell); Mesilla Park, April 25 (Ford); Rinconada, April 26, 1904 (Surber); and during migration it was found common April 19-29 near Silver City (Hunn).—W. W. COOKE.

NEST.—On the ground under a bush or tuft of grass, made of rootlets, fine straws, and fibers, loosely put together. Eggs: 4 or 5, ground color white, lightly wreathed around larger end with specks and spots of reddish and purplish brown, a few spots scattered over the rest of the surface.

GENERAL HABITS.—This small, inconspicuous, gray Warbler might well have difficulty in keeping track of its friends and family as they move quickly about in the underbrush, which it frequents, were it not for the flashes of yellow from its tail coverts, not alone the upper coverts, which are yellow in many Warblers, but distinctively and more helpfully, both the upper and lower coverts.

In summer, Mr. Aiken says, the Virginia is found in scrub oak brush on hillsides up to about 7,500 feet; but in the migration it is found in the pines and among cottonwoods and willows bordering streams (Coues). In the Hondo Valley thickets bordering irrigation ditches, on August 13, 1904, we repeatedly heard a light "tchack" suggesting a Western Yellow-throat, but the shy, secretive birds eluded us. Finally, however, a molting adult *virginiae* was secured. At Lake Burford Doctor Wetmore found it "common among the thickets of small oaks in the gulches and on the higher slopes around the lake, but so secretive that it was difficult to observe. The males often sang from the tops of tall yellow pines, where they chose a hidden perch and remained motionless. When disturbed by some one moving about below, they flew off for some distance, sometimes remaining in the pines and continuing to sing, or again pitching down into the undergrowth where they were hidden from sight" (1920a, p. 408).

During the nesting season, Mr. Aiken says, "the male is very musical . . . uttering his *sweet* ditty continually as he skips through the bushes in search of his morning repast; or, having satisfied his appetite, he mounts to the top of some tree in the neighborhood

of his nest and repeats at intervals a song of remarkable fullness for a bird of such minute proportions" (in Coues, 1878, p. 223). The common forms of the song are described by H. D. Minot as "*che'-we-che'-we-che'-we, wit-a-wit-wit-wit . . . and che-we'-che-we'-che-we'-che-a-che'-ache'.*"

ADDITIONAL LITERATURE.—HOWARD, C. W., Bull. Cooper Orn. Club (= Condor, vol. 1), 63-64, 1899.

ROCKY MOUNTAIN ORANGE-CROWNED WARBLER: *Vermivora celáta*
oréstera Oberholser

PLATE 64

DESCRIPTION.—*Wing:* 2.5 inches. *Adult male:* Crown with a partially concealed orange-brown patch, upperparts yellowish olive-green, brighter on rump; wings and tail fuscous, edged with yellowish olive; underparts yellow, washed with olive. *Adult female:* Crown patch usually duller and sometimes obsolete. *Young:* Generally without crown patch.

RANGE.—Breeds in southwestern Canada (British Columbia) and the western United States except the Pacific Coast district; winters south to central and southern Mexico.

STATE RECORDS.—The Rocky Mountain Orange-crowned Warbler has been found breeding [at Lake Burford, May 23-June 19, 1918 (Wetmore)]; in the Capitan Mountains, August 6, 1903; at Arroyo Hondo, 8,000 feet, August 13, 1904 (Gaut); at Willis, 8,000 feet, August 19, 1903; near Twining, 10,700 feet, August 5, 1904 (Bailey); and in the Culebra Mountains, 12,300 feet, August 20, 1904 (Gaut). It has also been taken in Hondo Canyon, 8,200 feet, August 10, 1904, and Santa Clara Canyon, August 25, 1906 (Bailey).

In the fall migration, it has been recorded at Rio Puerco, September 3, 1905 (Hollister); in the mountains near Taos, at 8,800 feet, September 17 and 19, 1903 (Bailey); at Riley, September 23, 1905 (Hollister); Lake Burford, at 7,600 feet, October 2, 1904 (Gaut); Quemado (10 miles southwest) October 3, 1906 (Bailey); Santa Rosa, October 7, 1902 (Gaut); and Gila, Grant County, October 8, 1908 (Goldman). It is reported from the Gila National Forest, where it was common at Reserve, August 20-September 6, 1908 (Birdseye); from the Datil National Forest, in the San Mateo Mountains, September 21 and 22, 1906 (Bailey); and at 9,500 feet September 1, 1909 (Goldman); Largo Canyon, and also Pinyon Mountains, October 2-4, 1906 (Bailey). It has also been recorded from Guadalupe Canyon, Mexican Boundary Line, Fort Defiance, and Big Hatchet Mountains.

In the spring migration, it was taken April 28 and May 3, 1904, at Rinconada, 5,600 feet (Surber).

NEST.—On or near the ground, made largely of leaves and fine grasses. *Eggs:* 4 or 5, white, with specks or spots of brown, more numerous at the larger end.

FOOD.—Small insects.

GENERAL HABITS.—The quiet, yellowish green Orange-crowns were met with several times in the field season of 1904. At about 10,000 feet on Lake Fork above Twining, on August 4, we were much pleased to discover one of them feeding bob-tailed young in the willow bushes near camp; at timberline on the Culebra Mountains, about two weeks later, another was seen in a willow patch, and still later, at Lake Bur-

ford, one was found in the cottonwoods at camp in fresh fall plumage. Some years afterwards Doctor Wetmore again found the birds at Lake Burford, nesting in small numbers in gulches below the lake. A male "encountered on an oak-grown hillside over which small yellow pines and Douglas firs were distributed" often flew up into the trees, usually conifers, "to remain quiet and sing from some hidden perch . . . The song, given constantly, was a rapid hurried trill, resembling the syllables *tsce-ee-ee-ee-er-er-er*" (1920a, p. 409).

In Nevada Dr. W. P. Taylor found the birds in "patches of low, tangled quaking aspens on the higher slopes of the mountains" (1912, p. 409).

[OLIVE WARBLER: *Peucedramus olivaceus* (Giraud)]

DESCRIPTION.—*Male*: Length (skins) 4.4–5.1 inches, wing 2.8–3.1; tail 2; bill .3–.5; tarsus .7. *Female* slightly smaller. *Adult male in summer*: Head, neck, and chest orange-brown, except for broad black eye stripe; rest of upperparts mainly gray, tail and wings dull blackish, with light edgings, tail with two or three outer pairs of feathers partly white; wings with two conspicuous white bars, median underparts dull white, sides gray; bill blackish, brownish at base above. *Adult male in winter*: Like summer male but brown duller, more clay-color, back more olivaceous, and sides browner. *Adult female and male of second year*: Brown of male replaced by yellowish, black of eye-stripe by dusky; throat sometimes nearly white; white wing bars narrower than in adult male. *Young in juvenal plumage*: Upperparts dusky olive-brown, sides of head and neck and anterior underparts buffy; greater coverts tipped with yellowish, median coverts with white.

RANGE.—Breeds in Transition Zone of the mountains of southern and central Arizona and south on highlands of Mexico to Guatemala; winters mainly in highlands of Mexico and Guatemala (a few probably winter in Arizona).

STATE RECORDS.—In McKnight Canyon, which opens on the Mimbres River at the Three Circle Ranch, Dr. W. H. Bergtold, on October 4 and 5, 1906, saw a number of warblers that he identified as Olive Warblers. As this was the first occurrence noted for New Mexico and a "sight identification," he did not publish the record, and now urges that it be disregarded. But in view of Doctor Bergtold's reputation as an observer, and the fact that he had previously become so familiar with the birds in Chihuahua and Durango that he was then and is now "certain" that they were Olive Warblers, together with the fact that they have been found by Dr. A. K. Fisher in the Chiricahua Mountains in Arizona and should be looked for in adjoining ranges in New Mexico, it seems important that the attention of collectors be called to the matter in the hope that specimens will be obtained which will corroborate Doctor Bergtold's highly probable "sight identification."

NEST.—In the fork of a conifer 30 to 50 feet from the ground, made like those of the gnatcatchers with bits of moss, lichen, fir blossoms, and spider web, lined with rootlets. *Eggs*: 3 or 4, olive-gray or sage-green, with black markings sometimes almost obscuring the ground color.

GENERAL HABITS.—This brown-fronted Warbler, first definitely recorded from the United States by Mr. Henshaw, who found it on Mount Graham, in Arizona, is a bird of open pine forests, which feeds in a leisurely manner more like that of a Vireo or a Pine Warbler than

the ordinary Warblers, often clambering slowly and deliberately over the branches in its search for food. Its song is said by W. W. Price to be a liquid "*quirt, quirt, quirt*, in a descending scale," (1895, p. 17) and its call is "a rapid, whistled *peto* closely resembling the call of the Tufted Titmouse" (Chapman). As Mr. Swarth found one in the Huachuca Mountains in February when the snow was deep, and others in March, a few may winter in the mountains.

ADDITIONAL LITERATURE.—HOWARD, O. W., Bull. Cooper Orn. Club (= Condor, vol. 1), 37-39, 1899.—SWARTH, H. S., Cooper Orn. Club of Calif., Pac. Coast Avifauna IV, 53, 1904.—WILLARD, F. C., Condor, XII, 104-107, 1910 (nest).]

WESTERN YELLOW WARBLER: *Dendroica aestiva mörcomi* Coale.¹

DESCRIPTION.—*Male*: Length (skins) 3.9-4.9 inches, wing 2.4-2.8. *Female*: Length (skins) 4-4.6 inches, wing 2.2-2.7. *Adult male*: Upperparts yellowish olive-green, the wing feathers broadly edged with yellow; tail feathers except middle pair with inner webs largely light yellow; underparts yellow, chest and sides narrowly streaked with brick-red. *Adult female*: Duller, streaks if present much duller, but usually wanting. *Young*: Similar to female but still duller, upperparts grayer, underparts sometimes dull whitish.

COMPARISONS.—The two breeding Yellow Warblers of New Mexico can be distinguished by range, the Lower Sonoran form, the Sonora, being as yet recorded only from the lower Rio Grande. In migration, however, all New Mexico forms may be found together, and can be safely identified only by careful comparison of skins. In general, the *Alaska* is the darkest and dullest, the head olive-green like the back, the wing edgings the least conspicuous; while the *Sonora* is the palest, with yellow head, yellowish olive-green back, pale underparts, chest and sides more narrowly streaked with brown. (See pp. 614, 615; Plate 64.)

RANGE.—Breeds in western United States east to western Montana, Wyoming, and central Colorado south to northern New Mexico and west to Nevada; winters south through western and central Mexico at least to Panama.

STATE RECORDS.—The Yellow Warbler is represented in New Mexico by three forms: the Western is the common breeding bird of the northern half of the State, the Sonora breeds less commonly in the southern part, and the Alaska passes across the State in migration on the way from its Alaska breeding grounds to its winter home in Middle America. The breeding forms are abundant in their respective districts throughout the Rio Grande Valley.

This race breeds south to Shiprock, 5,000 feet (Gilman); Espanola, 5,500 feet, and Rinconada, 5,800 feet (Surber); also probably at Anton Chico, 5,500 feet, and Ribera, 6,000 feet (Bailey). [Common in the willows along streams in northern Santa Fe County, nesting up to 7,500 feet. Fresh eggs, June 1-15 (Jensen, 1922). Common in the cottonwoods at Albuquerque in June and July, 1917, and May 3, 1920. Young left the nest July 12, 1917; it was numerous in the Pecos Valley, May, 1924 (Ligon).]

During the fall migration this form has been taken at about 6,000 feet, near the base of Sierra Grande, about August 15, 1903 (Howell), and at Camp Burgwyn, 7,200 feet (Anderson), both of these places being above the normal breeding range. It has also been taken at Socorro, 4,600 feet, August 15, 1909 (Goldman), as it was migrating across the breeding grounds of *sonorana*.—W. W. COOKE.

¹ This replaces *Dendroica aestiva* in New Mexico, its recognition as a subspecies heretofore having been inadvertently overlooked.

NEST.—In bushes or trees, compact and cup-shaped; made largely of gray plant fibers, lined with down and sometimes hair or a few feathers. *Eggs*: Usually 4, grayish or greenish, often heavily marked all over with brown, blackish, and purplish, tending to wreathe around the larger end.

FOOD.—Over 97 per cent insects and a few spiders. Among the insects eaten are ants, small bees, and wasps, caterpillars, small leaf beetles, cotton-boll weevils, alfalfa weevils, codling moths, leaf hoppers, and black olive scale. "It is evident that the presence of a few Warbler nests in an orchard goes far to safeguard the trees from attacks of insect enemies. The inference is plain that the presence of insectivorous birds should be encouraged by the orchardist by every means in his power" (Beal).

GENERAL HABITS.—The Yellow Warbler, of whatever form, nesting and singing in alder and willow thickets bordering streams and also familiarly in park shrubbery and orchard trees, is one of the most easily seen and best known of the warblers. Its call is a fine chip and one of the phrases of its bright song is *wee-chee, chee, chee, chur-wee*.

Heard continually in warm summer days and easily traced to its pretty gray nest, this little Warbler has suffered so much from the impositions of the big Cowbird that it has actually acquired a habit of self protection, building a second, or even a third story to its nest to immure the unwelcome egg.

In the city of Albuquerque both young and old were abundant, July 28 and 29, 1919, Mr. Ligon writes, collecting about the cottonwood trees on which was late cotton, and eating the seed.

ADDITIONAL LITERATURE.—ALLEN, G. M., *Birds and Their Attributes*, pls. facing pp. 204 and 206, pp. 235-236.—MOUSLEY, H., *Auk*, XXXVI, 339-348, 1919 (relation of singing tree to nest).

SONORA YELLOW WARBLER: *Dendroica aestiva sonorana* Brewster

PLATE 64

DESCRIPTION.—*Male*: Length (skins) 4.2-4.8 inches, wing 2.3-2.6; tail 1.8-2.2; bill .4; tarsus .7-.8. *Female*: Length (skins) 4.3-4.6 inches, wing 2.2-2.4. Like the Western Yellow Warbler but male with back often streaked with chestnut; rump, wings, and tail much yellower, the yellowish edgings of primaries and coverts broader; underparts more faintly and sparsely streaked; the female paler and grayer than the female Western.

COMPARISONS.—See Comparisons under Western Yellow Warbler, p. 613.

RANGE.—Breeds in Lower Sonoran Zone of southeastern California, southwestern Utah, southern and western Arizona, New Mexico, and western Texas to Chihuahua, Sonora, and Lower California; winters from Mexico south to Guatemala and Nicaragua.

STATE RECORDS.—The lower Rio Grande in New Mexico apparently marks the most northern extension of the range of the Sonora Yellow Warbler. It is a common breeder at Mesilla (Merrill), where it had eggs, probably of a second set, as late as July 21, 1913. It ranges north to Fort Fillmore (Henry), and on the south was taken, July 3, 1892, at Cajon Bonito Creek, just south of the New Mexico line (Mearns).

In spring migration, it seems to have been noted April 30, at Silver City, 6,000 feet (Hunn), where it was seen June 27-July 12, 1894 (Fisher). It was probably

this form that was found arriving May 13, 1889, at Cooney (Barrell).—W. W. COOKE.

GENERAL HABITS.—From Mesilla Park Professor Merrill writes that the Sonora Yellow Warblers "may be seen . . . in the thickets along the river and in patches of big sunflowers." In the thickets they were quite numerous in 1913, and on July 21 he found two nests in the small willows, two to three feet from the ground. One nest had four eggs, but the other one had been despoiled, having only one egg and it with a hole pecked in one side. The stomach of a specimen taken showed many plant lice and small caterpillars (MS).

ALASKA YELLOW WARBLER: *Dendroica aestiva rubiginosa* (Pallas)

DESCRIPTION.—*Male*: Length (skins) 4–4.4 inches, wing 2.4–2.5. *Female*: Length (skins) 3.9–4.3 inches, wing 2.2–2.4. *Adult male*: Upperparts almost uniform olive-green, making yellow eye-ring and stripe over eye more distinct; tail and wings dark olive-brown, tail feathers with inner webs lemon-yellow; wing edgings narrow, mostly greenish yellow, underparts pure gamboge-yellow, streaked with brick-red. *Adult female*: Darker and duller olive-green above, duller yellow below.

RANGE.—Breeds mainly in Canadian Zone throughout most of Alaska, and western Canada, east to Hudson Bay and south to Vancouver Island; winters from Mexico to Nicaragua.

STATE RECORDS.—Breeding in Alaska and wintering south of the United States, the Alaska Yellow Warbler crosses New Mexico in fall migration, at least, and was taken at 8,000 feet on Arroyo Hondo, August 13, 1904 (Gaut); and in the Playas Valley, at Walnut Creek, Grant County, 4,800 feet, August 20, 1908 (Goldman). These dates show how very early it starts on its fall migration, for these birds were already more than a thousand miles south of where they had nested.—W. W. COOKE.

BLACK-THROATED BLUE WARBLER: *Dendroica caerulescens caerulescens* (Gmelin)

DESCRIPTION.—*Male*: Length (skins) 4.3–4.7 inches, wing 2.4–2.6; tail 1.9–2.1; bill .3–.4; tarsus .7–.8. *Adult male in spring and summer*: Upperparts mainly dark grayish blue, tail and wings black edged with blue, tail with white patches near tip of inner web on three outer feathers; wing with white patch at base of primaries; sides of head, throat, and sides black; rest of underparts white. *Adult male in fall and winter*: Only slightly different but feathers of back narrowly tipped with greenish, of throat and sides with white. *Adult female*: Upperparts dusky olive-green, with bluish tinge strongest on crown and upper tail coverts, tail usually with white patches, wing with white patch at base of primaries; superciliary narrow, whitish; underparts pale yellowish or whitish, the sides darker.

RANGE.—Breeds in Canadian and Transition Zones from northeastern Minnesota, central Ontario, and northeastern Quebec south to Connecticut, Pennsylvania, southern Ontario, and central Minnesota; winters from Florida to West Indies. Accidental in Nebraska, Kansas, Colorado, New Mexico, and California.

STATE RECORDS.—A Black-throated Blue Warbler was taken on October 8, 1904, at 8,000 feet, in the Gallinas Mountains (Gaut); and is now in the collection of the Biological Survey. It was, of course, a straggler that had wandered a thousand miles from its normal route. Doctor Henry says of this species: "A few observed on the Mimbres and one along the Rio Grande near Fort Thorn in May," but it may be that he was mistaken in his identification.—W. W. COOKE.

HOOVER WARBLER: *Dendroica coronáta hoóveri* (McGregor)

DESCRIPTION.—*Type:* Male: wing 3 inches, tail 2.3. *Adult male in spring and summer:* Crown, rump, and sides of breast with yellow patches; upperparts bluish gray, back streaked with black; tail black, two or three outer pairs of feathers with white patches near tip; wings with two white bars, throat white, breast black, streaked and tipped with white, center of belly white, flanks streaked. *Adult male in fall and winter:* Crown and back grayish brown, crown patch partly concealed, back indistinctly streaked; rump and tail as in spring, wings with brownish bars; underparts white, breast washed with brown, yellow patches and streaking less pronounced than in spring. *Adult female in spring and summer:* Similar to summer male but smaller and color patches smaller and duller, the upperparts tinged with brown. *Adult female in fall and winter:* Similar to winter male but upperparts browner, color patches smaller, anterior and lateral underparts pale buffy brown, median parts dull yellowish white.

COMPARISONS.—The Hoover Warbler, rare in New Mexico, should not be confused with the common Audubon Warbler and can easily be recognized by its white throat.

RANGE.—Breeds in Hudsonian and Canadian Zones from tree limit in north-central Alaska and northwestern Mackenzie south to Ontario, central Alberta, and northern British Columbia; winters from California and Arizona south to southern Lower California, Vera Cruz, and Mexico. Recorded from New Mexico in migration.

STATE RECORDS.—In the spring of 1904 the Hoover Warbler was found fairly common in migration at Rinconada (Surber); and specimens were taken from April 16 to May 2. This seems to be the only certainly known occurrence of the species in the State. Doctor Henry says: "Very abundant everywhere during the months of April and October. First observed at the Mimbres April 2." But as he makes no mention of *auduboni* in any of his lists it is evident that his *coronata* was really the latter species.—W. W. COOKE.

GENERAL HABITS.—The large tame, restless Hoover Warbler, the western form of the Myrtle Warbler, with white throat and yellow rump, "ranges from the ground and low bushes to tree-tops in scrub lands and half open woods, avoiding the deep forests."

AUDUBON WARBLER: *Dendroica auduboni auduboni* (J. K. Townsend)

DESCRIPTION.—*Male:* Length (skins) 4.8-5.4 inches, wing 2.9-3.2; tail 2.1-2.4; bill .3-.4; tarsus .7-.8. *Female:* Length (skins) 4.8-5 inches, wing 2.9-3.1; tail 2.1-2.3; bill .3-.4; tarsus .7-.8. *Adult male in spring and summer:* Crown, rump, throat, and sides of chest, yellow; upperparts bluish gray; back streaked with black; tail and wings black, tail with inner webs of four or five outer feathers white near tip; wings with large white patch; underparts with black of chest separating yellow of throat and sides from white of belly. *Adult male in fall and winter:* Gray of upperparts obscured by brown wash, wing markings tinged with brown, black of underparts mostly overlaid by brownish edgings of feathers. *Adult female in spring and summer:* Similar to the summer male but duller and color patches restricted; upperparts usually tinged with brown, wings with dull bars. *Adult female in fall and winter:* Similar to winter male but smaller and still duller, color patches and streakings restricted and duller. *Young in juvenal plumage:* Upperparts brown, thickly streaked with black and white; underparts white, streaked with black, grayish white below.

COMPARISONS.—The Audubon and Hoover Warblers can be distinguished from all other Warblers by the yellow patches on crown, rump, and sides of breast, and

the Audubon can be distinguished from the Hoover by the addition of the yellow throat, and by having white patches on four or five instead of two or three outer tail feathers. (See p. 616.)

RANGE.—Breeds in Transition and Boreal Zones from southern British Columbia, central Alberta, and southwestern Saskatchewan south to western Nebraska, mountains of southern New Mexico, northern Arizona, and Lower California; winters (casually) in British Columbia, Washington, and Oregon, (abundantly) in valleys of southern California, Lower California, and southern and western Arizona, occurring south to Guatemala.

STATE RECORDS.—The Audubon Warbler breeds mainly in the higher mountains of northern New Mexico, most commonly from 8,000 to 9,000 feet. In the Sangre de Cristo Mountains, along the Upper Pecos, at 8,000 feet, it was found July 13, 1903 (Bailey), and had been found an abundant breeder there from 7,800 feet upward, when young out of the nest were noted July 18 (Henshaw). In the Wheeler Peak amphitheater, at 11,400 feet, it was seen carrying food, July 20, 1904, and on July 26 three birds were seen in the timber a little lower (Bailey). [Young were out with adults on Round Mountain north of Cowles at 10,000 feet, July 18, 1919, and it was common in heavy timber on the east slope of the Wheeler Peak country May 27–June 22, 1924 (Ligon). In northern Santa Fe County it was common from 7,500 to 10,000 feet. Nests were found, June 6, 1920, and June 5, 1921, both with eggs (Jensen).] At Glorieta, 7,500 feet, July 7–10, 1903, it was seen in the cottonwoods (Bailey); and several were noted July 31–August 1, 1904, in the pines near Tres Piedras, 8,000 feet (Gaut). [At Lake Burford, May 23 to June 19, 1918, it was found nesting in fair numbers (Wetmore). At Mount Taylor it was seen feeding young out of the nest, July 25, 1917 (Ligon).] It also breeds in the Zuni Mountains (Goldman), where, June 14–19, 1909, it was the only common Warbler. A few seen were among the higher pines on Bear Ridge at 8,000–8,500 feet, but it was most common above the latter altitude. [Young out of the nest were found on June 28, 1920, in the Black Range 30 miles southwest of Chloride (Ligon).]

In the southern part of the State, in the Capitan Mountains, they were seen in small numbers, June 14, 1899, one being noted at the very top of the mountains, 9,600 feet (Bailey); and were found rather numerous among the yellow pines at 8,500 feet on the same mountains, July 10–13, 1903 (Gaut). At Cloudercroft, 9,000 feet, in the Sacramento Mountains, they were common May 29–June 2, 1900 (Bailey); a specimen was taken there July 17, 1901 (Fuertes); and they were common July 23–August 1, 1909 (Green).

The fact that some individuals of this species breed at very high elevations—up to 12,000 feet in Colorado—where conditions are not suitable for nesting until mid-summer, explains why it is found so late in spring or early in summer in districts where it does not breed. Thus it was abundant at Marathon, Texas, May 13–20, 1901, and occasional at Boquillas, Texas, May 22–30, 1901 (Oberholser); two males were seen June 4, 1907, in the pinyon belt at 6,500 feet near Bayfield, Colorado (Cary); a half dozen, still in a flock, were noted June 9, 1912, out in the sagebrush near Dickey, Idaho (Wyman). All these instances undoubtedly refer to birds still in migration, and it follows therefore that the mere presence of this species late in May or even early in June is not sure proof that it will breed in that locality. Among such records may be classed the following: Several seen up to May 28, 1903, at Santa



From Biological Survey

FIG. 107. Audubon Warbler

Rosa, 4,600 feet (Bailey); Silver City, 6,000 feet, May 1-27, 1884 (Marsh); Dog Spring, Grant [Hidalgo] County, 4,800 feet, May 24, 1892 (Mearns); Shiprock, 5,500 feet, common in May, 1907 (Gilman); and at the head of the Mimbres, 6,500 feet, common at first but soon became scarce, May 11-30, 1906 (Bailey).

Fall migration is in full swing by the last of August, though the species is most common in September. Two were taken September 11, 1913, near Koehler Junction (Kalmbach); it was noted east to Johnson Mesa, near Folsom, September 12, 1903 (Howell); to Coyote Creek, near Black Lake, September 8, 1903, and on August 12, 1903, as high as 11,600 feet, at the foot of Pecos Baldy, with a mixed flock of fall migrants (Bailey).

It probably does not winter in New Mexico. The last was seen near Willis September 22, 1883 (Henshaw); it was still common September 30, 1903, at Lucero Creek (Bailey); [two or three were noted October 2, 1916, at White Water Creek (Skinner)]; it was common October 1-12, 1908, in the higher parts of the Chuska Mountains (Birdseye); October 5, 1915, at Chloride (Ligon); common to October 8, 1902, at Santa Rosa (Gaut); one at Espanola, October 16, 1904, and the last at Glenwood, November 2, 1906 (Bailey).

In the spring migration, its return was noted at Cooney April 9, 1889, and at Carlisle, April 17, 1890 (Barrell); also at Silver City April 5, 1914 (Kellogg); at Rinconada May 3, 1904 (Surber); and at Willis, May 2, 1900 (Birtwell); great numbers were seen 1 to 3 miles north of Albuquerque, May 3, 1920 (Ligon).—W. W. COOKE.

NEST.—Usually in pines, firs, or spruces 20 to 50 feet from the ground, but also in deciduous trees and bushes only a few feet from the ground; sometimes bulky, made variously of twigs, strips of bark, weed stems, rootlets, moss, and dried grass, lined with fine grasses or horsehair and relatively large feathers. *Eggs*: Usually 4, dull white to greenish or bluish white, spotted and blotched with olive-brown, lilac and lavender, sparingly or boldly, but usually more or less wreathed around the larger end.

FOOD.—Nearly 85 per cent insects and spiders and about 15 per cent weed seed and wild or belated fruit. The insects include ants, gnats, and other flies, one-sixth of the whole food; bugs, one-fifth of the food, including black olive scale, plant lice, leaf hoppers and tree hoppers; caterpillars, and snout beetles. It devours an "immense number" of ants. "It must be evident to the most casual reader that this bird is a valuable asset in the orchard and garden" (Beal).

GENERAL HABITS.—Great numbers of the active gnat-catching Audubon Warblers with their yellow throats and rumps were seen by us in the trees and bushes bordering Lucero Creek in the mountains above Taos, the last of September. In the sunny mornings they seemed to be everywhere, from the bushes to the tree tops, uttering their characteristic *tchip* as they flew. They busied themselves mainly picking up tidbits from the branches of the trees at this time, probably because, with snow on the mountains above, there were not many aerial insects left for them to catch.

Earlier in September we had found them common in the Jemez Mountains above Santa Clara, at and above 10,000 feet; on stony ridges and among pine woods in Valle Santa Rosa and Jemez Canyon; and on the top of the San Mateo Mountains.

At Lake Burford, in May and June, 1918, when Doctor Wetmore found them nesting "in fair numbers in the yellow pine areas surrounding the lake," the "males were found singing from the tops of the tallest pines and were slow and leisurely in their movements, in great contrast to their habit at other seasons. Frequently while singing they remained on one perch for some time, so that often it was difficult to find them. The song resembled the syllables *tsil tsil tsil tsi tsi tsi tsi*" (1920a, p. 409).

An Audubon Warbler's nest found by Doctor Grinnell in California had the wing and tail feathers of juncos and other small birds mixed with its grasses and plant fibers, and was thickly lined with Mountain Quail feathers, some of the chestnut-colored ones sticking up above the rim conspicuously (1908, p. 112). In New Mexico, Mr. Jensen has found their nests lined with the feathers of Bluebirds and Long-crested Jays. If a nest with young is discovered, he says, "both parent birds try every means possible to draw the attention of the intruder away from the nest." He has seen them "drop with folded wings from the top of a tree and flutter among the leaves as if each had a broken wing" (1923b, p. 465).

In their rôle of flycatchers, J. G. Tyler has found that they not only "share with Say Phoebe the habit of catching flies from a window," but sometimes become "so engrossed in this occupation as to cling for several seconds to the screen where a south-facing window affords a bountiful supply of this kind of food" (1913, p. 100).

ADDITIONAL LITERATURE.—SWARTH, H. S., Educational Leaflet 126, Nat. Assoc. Audubon Soc.

CERULEAN WARBLER: *Dendroica cerulea* (Wilson)

DESCRIPTION.—*Male*: Length (skins) 4.1–4.5 inches, wing 2.4–2.7; tail 1.7–1.9; bill .3–.4; tarsus .5–.7. *Female* slightly smaller. *Adult male*: *Upperparts light grayish blue*, brighter on head, approaching cerulean or azure, white eye-stripe bordered by narrow black stripes, *back streaked with black*; wings and tail black with bluish edgings, tail broadly patched with white near tip; wings with two white bars; *underparts white*, with narrow bluish throat band and bluish streaking along sides. *Adult female*: Upperparts varying from light grayish blue to grayish olive-green, entirely unstreaked, wings with two white bars; superciliary whitish or yellowish; underparts whitish or pale yellowish.

RANGE.—Breeds mainly in Austral Zone from southeastern Nebraska, southern Michigan, southern Ontario, western New York, and West Virginia south to central Alabama, Louisiana, and northeastern Texas; winters in western South America from Panama to Peru; in migration straggles to Lower California, New Mexico, Colorado, New Jersey, and Rhode Island.

STATE RECORDS.—A single bird "observed at the Mimbres during the latter part of April" by Doctor Henry is the only New Mexico record of the Cerulean Warbler, which does not come regularly farther west than northeastern Texas.—W. W. COOKE.

BLACK-POLL WARBLER: *Dendroica striata* (J. R. Forster)

DESCRIPTION.—*Male:* Length (skins) 4.6–5.5 inches, wing 2.8–3, tail 1.9–2.1, bill .3–.4, tarsus .7–.8. *Female:* Length (skins) 4.5–5 inches, wing 2.7–2.9, tail 1.8–2, bill .3–.4, tarsus .7–.8. *Adult male in spring and summer:* Crown black, in striking contrast to white cheeks, rest of upperparts olive, gray, or brown, streaked with black; tail and wings dusky, tail with two or three outer pairs of feathers with white patches near tip; wings with two white bands and greenish edgings; underparts white, sides streaked with black. *Adult male in fall and winter:* Without black crown, upperparts olive-green shading to gray on upper tail coverts; back, scapulars, and sometimes crown and rump streaked with black; wing bars white, line over eye olive-yellowish; throat, breast, and sides yellowish; sides streaked; belly white. *Adult female:* Similar to adult male in fall and winter but grayer above, whiter below, the black streaks, from bill to rump, better defined. *Young in juvenal plumage:* Upperparts grayish olive or olive-gray, with black, wedge-shaped shaft marks (except on rump), greater and middle wing coverts blackish; underparts whitish with rounded spots.

RANGE.—Breeds in Hudsonian and Canadian Zones from limit of trees in northwestern Alaska, northern Mackenzie, Keewatin, northern Quebec, and Newfoundland south to northern New England, Michigan, Manitoba, and northern British Columbia; winters in northern South America to Ecuador, Guiana, and eastern Brazil; migrates through Bahamas and West Indies; casual in Colorado, New Mexico, Mexico, Chile, and Ecuador.

STATE RECORDS.—The only record of the Black-poll Warbler in New Mexico is that by Doctor Henry, of "one or two only observed in April at the Mimbres." The species is of course accidental in that part of the State, but since it migrates regularly in spring through Colorado east of the foothills, it undoubtedly also passes through northeastern New Mexico.—W. W. COOKE.

NEST.—In conifers or on the ground, made of grasses, roots, lichen, and a few twigs, lined with fine grass and feathers. *Eggs:* 4 or 5, white, marked with brown, lilac, and gray, usually forming a wreath but sometimes marked all over.

GENERAL HABITS.—The Black-poll is one of the quiet, deliberate Warblers and one of the latest migrants. In speaking of its migration, Doctor Chapman says: "No Black-poll Warbler seems to spend the winter north of South America, while the southernmost breeding grounds are in northern New York and central Colorado. Therefore, no Black-poll Warbler can have a migration route less than twenty-five hundred miles in length, and the extremes of the range—Alaska and Brazil—are twice that distance apart . . . individuals that nest in Alaska travel at an average speed of not less than seventy-five miles per day" (1907, p. 197).

BLACKBURNIAN WARBLER: *Dendroica fusca* (Müller)

DESCRIPTION.—*Male:* Length (skins) 4.4–4.7 inches, wing 2.5–2.7, tail 1.8–1.9, bill .4, tarsus .6–.7. *Female* slightly smaller. *Adult male in spring and summer:* Crown stripe, superciliary, patch on side of neck, and anterior underparts intense orange or flame-color; rest of head, back, tail and wings black, back streaked with white, tail with two or three lateral feathers largely white, wings with conspicuous white patch on coverts; lower underparts white, more or less tinged with yellow, sides streaked with black. *Adult female in spring:* Like the male in color pattern but colors dulled

and restricted, the olivaceous back streaked, wings usually with two white bars. *Adults in fall and winter*: Similar to spring adults but colors duller. *Young in juvenal plumage*: Upperparts brown, color pattern of adult male partly suggested in pale buffy; wings as in winter adults but white bars tinged with brownish buff.

RANGE.—Breeds in Lower Canadian and Upper Transition Zones from Manitoba, southern Keewatin, Quebec, and Cape Breton Island to southern Alleghenies, southern New England, northern Michigan, and central Wisconsin; winters from central Mexico to Venezuela and Peru; in migration to Nebraska, Texas, and Kansas, straggling to Utah, New Mexico, and Bahamas.

STATE RECORD.—When Stephens visited the State, in 1876, he found the Blackburnian Warbler and, as his notes record, "killed a female, near Fort Bayard, New Mexico in May." He is the only one who has met this species in the State and it is an accidental visitor, since it comes west regularly not farther than the eastern side of the plains.—W. W. COOKE.

GRACE WARBLER: *Dendroica graciae* Baird

PLATE 64

DESCRIPTION.—*Male*: Length (skins) 4.3–4.6 inches, wing 2.5–2.6, tail 1.8–1.9, bill .4, tarsus .7–.8. Female slightly smaller. *Adult male in spring and summer*: Upperparts, including cheeks and sides of neck, slate-gray; crown and back narrowly streaked with black, tail with two outer feathers largely white on inner webs; wings with two white bands; line over eye, spot on lower lid, and anterior underparts bright yellow; rest of underparts white, sides streaked with black. *Adult male in fall and winter*: Similar to spring male but upperparts washed with brown, the black markings on crown, back, and sides obscured. *Adult female in spring and summer*: Like spring male but duller, gray of upperparts tinged with brown, black streaks indistinct, wing bars narrower, yellow and white duller. *Adult female in fall and winter*: Like adult male in winter. *Young in juvenal plumage*: Upperparts brownish tinged with olive, wing coverts conspicuously tipped with whitish; underparts gray or white, breast, belly, and sides spotted with blackish.

COMPARISONS.—At all seasons, adults and young may be known by their yellow throat, gray cheeks, and gray back.

RANGE.—Breeds chiefly in Transition Zone in mountains of southwestern Colorado, Arizona, New Mexico, Chihuahua and Sonora; winters in Mexico to Michoacan; casual in migration to central Colorado and western Texas.

STATE RECORDS.—The Grace Warbler breeds sparingly in the lower mountains of New Mexico, east to Mesa Yegua, 7,400 feet, where it was common June 25, 1903 (Bailey); near Las Vegas, at 8,500 feet, June 12, 1898 (Mitchell); Tres Piedras, 8,000 feet, July 11–19, 1892 (Loring); [not uncommon in the Sangre de Cristo Mountains, where a male was seen on Lake Peak, at 12,400 feet, and June 13, 1922, three near the Lake Peak trail, 9,000–10,000 feet (Jensen).] At Pogosa Springs, Colorado, just over the New Mexico line, it was one of the most abundant Warblers among the pines at 7,000 feet, May 28, 1907 (Cary). It has also been found breeding at 9,000 feet, June 16, 1909, on the top of Bear Ridge in the Zuni Mountains (Goldman); at Inscription Rock, July 24, 1873 (Henshaw); on Pinos Altos Mountains, 8,000 feet, July 8, 1894 (Fisher); and young of the year, July 31, 1909, in the pines on top of the mountain 20 miles northwest of Fort Defiance and just west of the New Mexico line (Nelson). [At Lake Burford a small number of males were seen on June 9 and 16, 1918 (Wetmore); and one was taken April 20, 1919, at the G. O. S. Ranch (Kellogg).]

In the fall migration, an adult was seen at Sierra Grande, August 18, 1903, and several young seen August 16, near its base (Howell); it was found rather rare near Willis, 7,800 feet, August 26–September 6, 1883 (Henshaw); one was seen at Albuquerque, October 7, 1889 (Birtwell); it was noted in the Douglas spruce of the higher San Mateo Mountains, August 13, 1905; Penasco, in the Sacramento Mountains September 6, 1902 (Hollister); and the Guadalupe Mountains, just south of the New Mexico line, August 21, 1901 (Bailey).—W. W. COOKE.

[In the spring, one was taken on April 20, 1919, at the G. O. S. Ranch (Kellogg)].

NEST.—(Three found) in pine, spruce and fir 50 and 60 feet from the ground; (one described) made compactly of vegetable fibers, strings, horsehair, oak catkins and bud scales, wool, down, and insect webbing; well lined with feathers and horsehair, and decorated or camouflaged with a small cone. *Eggs*: 3 or 4, white, lightly spotted with reddish brown.

GENERAL HABITS.—The handsome gray and yellow Grace Warblers are mainly birds of the pine woods. In the scattered yellow pines of Mesa Yegua we were delighted to find them working and singing loudly from the tips of the branches. Their song consisted of one rapidly repeated note.

At Lake Burford, where Doctor Wetmore found them in the tops of the yellow pines and occasionally in the oak undergrowth, at times coming down almost to the ground, their flight was "undulating and rather quick and jerky." The call note, he found to be a very faint *tsip* that carried only a few feet (1920a, p. 409). In the Huachuca Mountains, during the spring migration, Mr. Swarth found them associated with other Warblers, notably the Townsend, when they were distinctively flycatching, "constantly flying out from the trees to a considerable distance after insects" (1904, p. 55).

ADDITIONAL LITERATURE.—AVERILL, C. K., Condor, XXIV, 57–60, 1922 (law for nest height).—HOWARD, O. W., Bull. Cooper Orn. Club (= Condor, vol. 1), 39, 1899.—LADD, S. B., Auk, VIII, 314, 1891 (nest and eggs).

BLACK-THROATED GRAY WARBLER: *Dendroica nigréscens* (J. K. Townsend)

DESCRIPTION.—*Male*: Length (skins) 4.1–4.6 inches, wing 2.3–2.6, tail 1.9–2.2, bill .3–.4, tarsus .7–.8. *Female*: Length (skins) 4.2–4.8 inches, wing 2.1–2.4, tail 1.8–2, bill .3–.4, tarsus .7–.8. *Adult male in spring and summer*: Head, throat, and chest black except for white streaks on side of head, and bright yellow spot in front of eye; back, scapulars, and rump dark gray, more or less streaked with black, tail with two outer feathers largely white on inner webs; wings with two white bars; breast and belly white, sides streaked with black. *Adult male in fall and winter*: Similar to summer male but gray of upperparts and cheeks margined with brownish gray, black markings concealed, and sides washed with brown. *Adult female in spring and summer*: Sometimes not distinguishable from summer male, but, as a rule, with less black on the head, back browner and less heavily streaked, wings and tail browner and with less white, throat and upper breast mottled with black and white (Chapman). *Adult female in fall and winter*: Like summer female but upperparts and cheeks washed with grayish brown, black of throat margined with white, sides tinged with brown, the black markings obscured. *Young in juvenal plumage*: Above

brownish gray, a wide white stripe back of eye, anterior underparts gray, breast lightly streaked, belly white.

COMPARISONS.—The general gray color, black or black and white throat and absence of yellow, except for the one spot in front of the eye, are diagnostic.

RANGE.—Breeds in high upper Sonoran and lower Transition Zones from southwestern British Columbia, Nevada, northern Utah, and western Colorado south to northern New Mexico, southern Arizona, and northwestern Lower California; winters from Durango to Vera Cruz and Oaxaca.

STATE RECORDS.—[There seem to be only two nests recorded for the Black-throated Gray Warbler in New Mexico, May 22, 1920, and June 11, 1922, near Arroyo Hondo, about 6 miles southeast of Santa Fe (Jensen).]

At Santa Fe in June, 1874, several adult males were seen and a specimen was taken on June 16, in worn plumage as though breeding, though no nests could be found nor were any females seen (Henshaw). Old birds were noted feeding full grown young in July, 1907, in the Chuska Mountains (Gilman); and they breed near by in both Arizona and Colorado.

One was seen and collected on July 3, 1903, near Pecos, 7,000 feet (Bailey); one adult male, early in July, 1892, at Fort Wingate, 7,000 feet, and Pinos Altos Mountains, 8,000 feet, July 8, 1894 (Fisher); San Pedro, July 9, 1889 (Bailey); San Luis Mountains, July 5-19, 1892 (Mearns). These last are very suggestive dates; five specimens were taken in July, and none earlier, though two persons had been making large collections in this district since the middle of April. Two were seen and one collected July 18, 1903, in the Capitan Mountains (Gaut); one at Carlsbad August 5, 1910 (Dearborn); they were fairly common August 6-8, 1908, in the Animas Mountains from 5,800 feet to the summit (Birdseye); young of the year were seen in August at Shiprock, 5,500 feet (Gilman); and one seen September 12, 1909, at 8,500 feet, near Monica Spring in the San Mateo Mountains (Goldman).

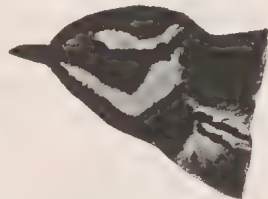
In the spring migration, the species was noted at Fort Bayard (Rockhill); once at Apache (Anthony); [one taken May 8, 1920, in the Animas Mountains, where they were common (Ligon)]; one taken May 10, at Fort Webster (Henry); they arrived April 7, 1884, at Silver City, and remained until May 12 (Marsh); also at the same place they were seen in migration, during April and May of 1904 and 1905 (Hunn); they arrived at Cooney April 6, 1889, and at Carlisle April 9, 1890 (Barrell); but did not remain to breed at either place.—W. W. COOKE.

A Warbler described from New Mexico by Doctor Henry as *Sylvicola nigricans* proves to be the same as *Dendroica nigrescens*.

NEST.—Low down in dense thickets of scrub oak or high up in pines; compact, deeply cup-shaped, made sometimes of grass, weed stalks, moss, and feathers, lined with feathers, horse, cow, and rabbit hair or fur. Eggs: Usually 4, white to pale greenish white, delicately spotted with reddish brown, purplish, and under shell marks of pale lavender, mainly about the larger end.

FOOD.—Partly small green caterpillars.

GENERAL HABITS.—The descriptively named Black-throated Gray Warbler is one of the attractive birds found in New Mexico and Arizona in the oak and pinyon pine country, where its simple, soothing zee-ee-zee-ee, ze, ze, ze makes one wish for better acquaintance. A pair that were watched by Mr. Bowles became so tame that while he



From Handbook (Fuentes)

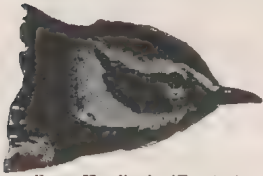
FIG. 108. Black-throated Gray Warbler

examined the nest the female stayed within five feet of him, improving the time by eating caterpillars. While she was brooding, the male was usually singing or chipping not less than fifty yards away (1902, p. 84). This is farther away from the nest than most of the Warblers sing, judging from those watched by Mr. Mousley in his interesting study of the distance of the singing tree from the nest (1919, pp. 339-348), though the Black-throated Blue he watched sang from fifty to ninety yards away, possibly due to exceptional conditions.

ADDITIONAL LITERATURE.—BOWLES, C. W., Condor, IV, 82-85, 1902.—FINLEY, W. L., American Birds, 127-135, 1907.

TOWNSEND WARBLER: *Dendroica townsendi* (J. K. Townsend)

DESCRIPTION.—*Male*: Length (skins) 4.2-4.8 inches, wing 2.5-2.7, tail 1.8-2, bill .3-.4, tarsus 1.1-1.2. *Female*: Length (skins) 4.2-4.9 inches, wing 2.4-2.6, tail 1.8-2, bill .3-.4, tarsus 1.1-1.2. *Adult male in spring and summer*: Crown, throat, and cheeks black, black of cheeks set in yellow; back, scapulars, and rump, bright olive-green, with black arrow-shaped markings; wings and tail blackish edged with gray, tail with two outer feathers largely white, wings with two conspicuous white bars; spot under eye, and breast, yellow; belly white, sides streaked with black. *Adult male in fall and winter*: Like the summer male but black of head obscured by olive-green feather tips, and of throat by yellow feather margins, chest and sides spotted with black. *Adult female in spring and summer*: Similar to spring male but crown olive-green spotted with black, cheeks olive, and black and white markings restricted; throat and breast obscurely marked with black. *Adult female in fall and winter*: Like spring female but upperparts, sides, and flanks slightly brownish, black markings less distinct. *Young in juvenal plumage*: Upperparts brown, broad superciliary line, buffy; belly white.



From Handbook (Fuentes)

FIG. 109. Townsend Warbler

RANGE.—Breeds in Boreal and Transition Zones from Prince William Sound and upper Yukon south to western Montana and Washington; winters from west-central California to Guatemala; in migration throughout Arizona and east to eastern parts of Wyoming, Colorado, and New Mexico, and in western Texas.

STATE RECORDS.—During migration, in both spring and fall, the Townsend Warbler crosses New Mexico. The earliest fall date is August 2, 1886, at Apache (Anthony); and the latest, October 18, 1902, at Gallo Canyon southeast of Corona (Gaut). It was noted in the Jemez Mountains up to 10,000 feet, August 28, 1906 (Bailey); and to 9,000 feet in September, 1908, in the San Francisco Mountains of the Gila National Forest (Birdseye). It ranged east to Coyote Creek near Black Lake, 8,000 feet, September 8, 1903 (Bailey), and to Penasco, in the Sacramento Mountains, September 6, 1902 (Hollister). At 7,800 feet, near Willis, it was found August 25 to September 28, 1883 (Henshaw).

In the spring, it was taken April 23, 1886, at Apache (Anthony); and May 6, 1904, at Rinconada (Surber).—W. W. COOKE.

NEST.—In small firs, made externally of weed stems and grasses lined with horse-hair (Silloway), or made of cedar bark, with a few fir twigs interwoven; lined with the stems of moss and flowers, patched externally with silvery plant fiber (Bowles). *Eggs*: White, sprinkled or wreathed with browns and purples.

FOOD.—Mainly insects and a few spiders, including stink bugs, leaf hoppers, scales, wasps and ants, caterpillars, engraver weevils injurious to trees, and weevils which destroy the staminate blossoms of conifers (5 stomachs contained 271).

GENERAL HABITS.—In the alder thickets along Coyote Creek, in the fall migration, we saw a number of the handsome Townsend Warblers with the black throat patches of summer obscured by yellow feather tips, and the large black arrow points showing well on their olive-green backs. At other times we found them in aspens and spruces. On Mount Graham, in Arizona, in September, Mr. Henshaw says they were seen "almost invariably in the tops of the tallest trees, where a glimpse might now and then be had of them as they dashed out after flying insects, or flew from tree to tree in their onward migratory course. The tracts of pine woods they shunned entirely, but affected the firs and spruces, and their flights from point to point were regulated and made longer or shorter by the presence or absence of these trees. Their movements were exceedingly rapid; a moment spent in passing in and out of the interlacing branches, a few hurried sweeps at extremities and they were off to the next adjoining tree to repeat the process again and again till lost sight of in the dense woods. Their only note was the common *tsip*" (1875, p. 200). On their breeding grounds in Montana, where they frequent the large tamaracks and Douglas spruce, their song is given by Mr. Silloway as "*reet, reet, reet, reeter-ee-zee*" (1904, p. 12).

ADDITIONAL LITERATURE.—BOWLES, J. H., Condor, X, 193, 1908.—BOWLES, J. H., and F. R. DECKER, Educational Leaflet 119, Nat. Assoc. Audubon Soc.—SILLOWAY, P. M., Condor, VIII, 109-110, 1906.

[OVEN-BIRD: *Seiurus aurocapillus* (Linnaeus)]

DESCRIPTION.—*Male*: Length (skins) 5-5.6 inches, wing 2.7-3.1, tail 2.1-2.3, bill .4-.5, tarsus .8-.9. Female the same size. *Crown with orange-brown patch between blackish stripes*; back, wings, and tail, plain dull olive-green; *underparts white, breast and sides heavily streaked with blackish*. *Young in juvenal plumage*: Upperparts bright cinnamon-brown, narrowly streaked with black, breast and sides lighter brown faintly streaked with black, belly white; wings and tail as in adult but wing-coverts black, tipped with rusty.

RANGE.—Breeds in Canadian, Transition, and Upper Austral Zones from southwestern Mackenzie (casually Lower Yukon Valley), northern Ontario, Quebec, and Labrador south to Virginia (in mountains to Georgia and South Carolina), southern Missouri, Kansas (casually Colorado, rarely southeastern Montana), and central Alberta; winters from central Florida (casually South Carolina), and islands on Louisiana coast, Bahamas, West Indies, and western Mexico. Recorded from northern South America. Casual in California.

STATE RECORDS.—The Oven-Bird is casual in Colorado and winters in Mexico, so that a few should cross New Mexico in migration; but as yet there is no sure record of its occurrence in the State. The specimen taken May 16, 1892, at Mosquito

Springs (Mearns), was less than a mile from the New Mexico boundary and, of course, would have crossed into the State within the next few hours.—W. W. COOKE.

ADDITIONAL LITERATURE.—PEARSON, T. G., Educational Leaflet 129, Nat. Assoc. Audubon Soc.]

GRINNELL WATER-THRUSH: *Seiurus noveboracensis notabilis* Ridgway

PLATE 64

DESCRIPTION.—*Male*: Length (skins) 5.1–5.8 inches, wing 2.9–3.2, tail 2–2.3, bill .5–.6, tarsus .8–.9. *Female*: Length (skins) 5–5.9 inches, wing 2.8–3.1, tail 1.8–2.3, bill .5–.6, tarsus .8–.9. Bill rounded, wings and tail unmarked. *Adults*: *Upperparts sooty olive-brown; line over eye white or very pale yellowish, stripe through eye dark brown; underparts usually white, throat finely, and breast broadly, streaked with blackish. Young in juvenal plumage*: Like adults but upperparts with feathers tipped with rusty and obscurely spotted with black, superciliary yellowish, underparts sulphur-yellow, partly washed with rusty.

RANGE.—Breeds chiefly in Boreal Zones from limit of trees in northwestern Alaska, northern Yukon, northwestern and central Mackenzie, and Keewatin south to northwestern Michigan, northwestern Nebraska, western Montana, and southern British Columbia; winters in Cuba, Porto Rico, and Bahamas, and from Mexico to Colombia; casual in California and Colorado.

STATE RECORDS.—In both the spring and fall migration, the Grinnell Water Thrush occurs in New Mexico, and was noted September 7, 1903, in Bear Canyon near Folsom (Howell); September 4–8, 1903, in the Jicarilla Mountains (Gaut); one at Fort Stanton August 30–September 1, 1908 (Tricks); [at Silver City one was taken September 1, 1918 (Kellogg)]; one at Shiprock in 1907 (Gilman); and one near Roswell, September 17, 1902 (Hollister).

Two specimens were noted May 6, near Silver City (Hunn). [At Lake Burford one was seen May 23 and 25, 1918 (Wetmore); in Santa Fe two stayed from late in May till about the middle of June, 1927 (Jensen).]—W. W. COOKE.

GENERAL HABITS.—Like the Oven-bird, the Water Thrushes are walkers, but, instead of frequenting dry, leaf-carpeted woods, they spend a large part of their time exploring the banks of streams or pools. Their songs, given from the tree tops, are loud, wild, and ringing.

On their northward journey, in the spring of 1928, two of these delightful birds stopped over for about three weeks in Mr. Jensen's garden in the heart of Santa Fe, where the river banks afforded them congenial hunting grounds.

MACGILLIVRAY WARBLER: *Oporornis tolmiei* (J. K. Townsend)

DESCRIPTION.—*Male*: Length (skins) 4.6–5.4 inches, wing 2.4–2.6, tail 2.1–2.5, bill .4–.5, tarsus .8–.9. *Female*: Length (skins) 4.6–5 inches, wing 2.1–2.3, tail 1.9–2.4, tarsus .8–.9. *Adult male in spring and summer*: Head and neck bluish slate, darkening to black on lores, and to blackish on throat and chest where the feathers are broadly tipped with grayish white; eyelids marked with white; back, wings, and tail plain olive-green, without white bars or patches; lower underparts lemon yellow, darkening on sides. *Adult male in fall and winter*: Like summer male but feathers of crown and hind-neck tipped with brownish, and throat more widely tipped with grayish. *Adult female in spring and summer*: Like summer male but feathers of

head and back tipped with brown, and ashy edges of feathers on throat and breast broader. *Adult female in fall and winter:* Similar to spring female but crown browner than back and throat more brownish.

RANGE.—Breeds mainly in Lower Canadian and Transition Zones from British Columbia, central Alberta, southern Saskatchewan, and southwestern South Dakota south to northern New Mexico, central Arizona and northern California; winters from Lower California to Colombia; casual in migration to North Dakota, Indiana, Nebraska, and central Texas.

STATE RECORDS.—Positive breeding records of the Macgillivray Warbler in New Mexico are few. A nest containing young was found in Pueblo Canyon near Taos, at 8,000 feet, July 17, 1904, and on August 10, a young one, out of the nest but still being fed by the old bird, was taken in Hondo Canyon at 8,200 feet (Bailey).

The previous year, on July 17, one was taken on Mora Creek and had probably nested not far distant. [On rare occasions, Jensen says, it visits his Santa Fe garden (1922).] It was common July, 1907, in the Chuska Mountains and was undoubtedly breeding (Gilman).

Fall migration begins so early that in 1886 the first migrant reached Apache on August 3 (Anthony); it was common on Diamond Creek, in the Mogollon Mountains, August 24, 1908 (Birdseye); one was seen still on Santa Clara Creek, August 24, 1906 (Bailey); three were seen at Fort Stanton, August 30, 1908 (Tricks); and it was found at Cooney, September 2-30, 1889 (Barrell). Some late fall records are: Horse Lake, September 24, 1904 (Bailey); San Luis Mountains, September 25, 1893 (Mearns); and the last at Apache, October 12 (Anthony).

The earliest spring migrants were seen at Fort Bayard on April 1 (Rockhill); Monument No. 40, on southern boundary, April 24, 1892 (Mearns); Mesilla Park, April 27, 1903 (Ford); Carlisle, April 30, 1890 (Barrell); and Silver City, May 3, 1884 (Marsh). At places where the species does not breed, it was noted until May 26, 1890, at Carlisle (Barrell); until May 27, 1884, at Silver City (Marsh); and until the late date of June 2, 1907, at Lordsburg (Bailey).—W. W. COOKE.

NEST.—Near ground in vines, ferns, weeds, or bushes; made of dried weeds, weed bark or grasses, lined with fine grasses, fine rootlets and sometimes horsehair. *Eggs:* Usually 4, white or buffy, spotted on the larger end with dark brown and lilac-gray, with a few pen lines and rusty stains.

FOOD.—Insects, including the click beetle, dung beetle, flea beetle, caterpillars, and the alfalfa weevil.

GENERAL HABITS.—The gray-headed, yellow Macgillivray Warbler is a bird of thickets, whether they be a few willows in the midst of sage plains, acres of chaparral, or dense tangled undergrowth in damp woods. In the dense undergrowth bordering an irrigation ditch near the Taos Pueblo, I had difficulty in locating a songster, his dark gray head and breast were cut off so sharply from the yellow belly that went with the sunlit branch below. In singing he threw up his head, uttering in rather leisurely manner, his loud, finch-like *tur, tur, tur, tur-ty-tah*. A few days later, under the cottonwoods, in a dense tangle of wild plums, wild rose, maple, and poison ivy, the absorbed musician



From Handbook (Fuentes)

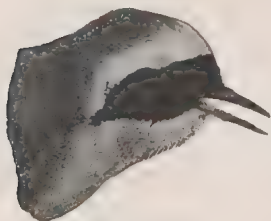
FIG. 110. Macgillivray Warbler

was encountered as an anxious guardian of the nest. He and his mate with food in their bills circled around chipping and switching their tails noncommittally. When they passed through a patch of sunlight the green on their backs warmed up prettily, and when the female went to a distance in the dark undergrowth, the white spots on her eyelids proved surprisingly good marks to follow. The nest, when finally discovered, proved to be only about a foot from the ground in a small bush conveniently marked by a pretty canopy of clematis, and in its cup lay four fuzzy-headed, yellow-gaped, hungry nestlings.

ADDITIONAL LITERATURE.—AVERILL, C. K., Auk, XXXVII, 572-579, 1920 (migration and physical proportions).—WYTHE, M. W., Condor, XVIII, 123-127, 1916 (nesting).

WESTERN YELLOW-THROAT: *Geothlypis trichas occidentalis* Brewster

DESCRIPTION.—*Male*: Length (skins) 4.5-5 inches, wing 2.2-2.4, tail 2-2.2, bill .4-.5, tarsus .8-.9. *Female*: Length (skins) 4.3-4.8 inches, wing 2-2.1, tail 1.9-2.1, bill .3-.4, tarsus .8-.9. Wing short, tail rounded. *Adult male*: Forehead and sides of head, black, bordered above with wide band of white, sometimes tinged with yellow; rest of upperparts plain olive-green, wings and tail without white bars or patches; underparts mainly bright orange-yellow. In winter more or less washed with brown. *Adult female and young*: Head without black or white; upperparts yellowish brown, underparts variable in amount of pale yellow.



From Handbook of
Western Birds (Fuerter)

FIG. 111. Western Yellow-throat

RANGE.—Breeds mainly in Transition and Sonoran Zones from southern British Columbia, Alberta, Saskatchewan, and North Dakota south to western Texas, Chihuahua, northeastern Lower California, and southeastern California; winters south to Cape San Lucas and Tepic.

STATE RECORDS.—The most common breeding Warbler in the lower parts of New Mexico is the Western Yellow-throat. It is common in the lowest parts of the State at Mesilla (Merrill), Carlsbad (Dearborn), and Santa Rosa (Bailey). It breeds up the Pecos River almost to the town of Pecos, and up the Rio Grande to Espanola, 5,500 feet (Surber). It was found common July 28, 1913, on the Jicarilla Reservation at the Burford, Horse, and Dulce Lakes (Ligon), and had probably nested there. [At Lake Burford it was estimated that fifteen pairs nested around the lake, May 23-June 19, 1918 (Wetmore). At the Rio Grande Gun Club lakes, many were seen June 16, 1919 (Ligon). A few are seen occasionally in Santa Fe and among the willows along the river (Jensen, 1922).]

In the fall migration, it was noted at Hondo Canyon, 8,200 feet, August 10, 1904 (Bailey); [between Socorro and Albuquerque, August 28, 1917 (Ligon)]; San Luis Mountains, September 29, 1893 (Mearns); and at Lake Burford until September 28, 1904 (Bailey).

In the spring, it has been recorded as a common migrant in April and May at Silver City (Hunn); all through May at Shiprock (Gilman); and May 5, 1904, at Rinconada (Surber).—W. W. COOKE.

NEST.—Usually on the ground at the base of a bush or bunch of weeds, or in a tussock of grass; deeply cup-shaped, made of grass, sometimes lined with horsehair.

Eggs: Generally 4, white, finely spotted on larger end with dark brown and black, sometimes with a few larger spots or lines.

Food.—Almost wholly insects and spiders, mainly leaf bugs, leaf hoppers, tree hoppers, plant lice, scales, and weevils, including the boll weevil, together with a few caterpillars and moths. "It is practically wholly insectivorous, and the insects it eats are either harmful or of little economic value."

GENERAL HABITS.—Damp brushy thickets, swampy patches of rank vegetable growths, and tule marshes are favorite resorts with the black-masked Yellow-throat and his yellowish brown mate, who, lacking his convenient ear marks, may be recognized by her dingy color, her graduated tail and the family *chack*. Speaking of the male, Professor Merrill writes: "This little Yellow-throat always puts me in mind of a small boy with a mask. Passing along patches of big sunflowers or in thickets of any kind one hears '*wichity, wichity, wichity*' and, if he knows the maker of the sound, smiles with delightful anticipation and pleasant memory. A little patient waiting and watching nearby and the sound stops a while and then, where you least expect, peering out from behind a leaf, is the little black-mask, overcome with curiosity to see you, and, you can imagine, making silently merry to have slipped so upon the intruder. But with one glance he slips out of sight and again comes '*wichity, wichity, wichity*'" (MS).

ADDITIONAL LITERATURE.—FINLEY, W. L., *American Birds*, 35-41, 1907.—MILLER, O. T., *Upon the Tree-tops*, 141-147, 1897; *With the Birds in Maine*, 282-285, 1904.

LONG-TAILED CHAT: *Ictéria virens longicaúda* Lawrence

PLATE 64

DESCRIPTION.—*Male*: Length (skins) 6.3-7.3 inches, wing 2.9-3.3, tail 3-3.4, bill .5-.6, tarsus 1-1.1. *Female*: Length (skins) 6.4-7 inches, wing 2.9-3.1, tail 2.8-3.2, bill .5-.6, tarsus 1-1.1. Bill stout, curved; wings much rounded, tail long and rounded, feet stout. *Adult male in spring and summer*: Upperparts, including wings and tail, grayish olive-green, crescentic mark on lower eyelid, superciliary and malar stripe, white; lores, and line under eye, black; anterior underparts and wing linings bright yellow, posterior, white. *Adult female in spring and summer*: Similar to spring male but sometimes duller, lores grayish, lower mandible usually light colored basally. [Adults in fall and winter, similar, but upperparts brighter, the flanks more buffy and the bill brighter (Ridgway).] *Young*: Upperparts olive, lores gray, throat whitish, chest and sides grayish; rest of underparts white.

RANGE.—Breeds in Sonoran Zones from southern British Columbia, Montana, and North Dakota south to Guanajuato and Jalisco; winters on tableland and west coast from Chihuahua to Oaxaca.

STATE RECORDS.—Comparatively few notes have been recorded of the presence of the Long-tailed Chat in New Mexico, but it keeps so well hidden in the bushes that it is easily overlooked. [It is common where there are thick bottoms of underbrush along streams (1916-1918); common about Taos and the Rio Grande bottom between Embuda and Espanola, June 21-22, 1924 (Ligon). Along the Santa Fe River three or four pairs nest in willows or vines. Fresh eggs, June 10-July 1

(Jensen).] It was noted in the Pecos Valley at Ribera, and below, June 30-July 2, 1903 (Bailey); but has not been recorded elsewhere in the State east of the Rio Grande Valley. It is common at Mesilla Park and breeds north at least to Espanola, 5,500 feet (Surber), and to Taos, 7,000 feet (Bailey). In western New Mexico it breeds at Shiprock (Gilman), Fort Wingate (Henshaw), and Zuni (Woodhouse). Doctor Henry says that during the spring and summer of 1853 he saw a few on the Rio Mimbres at Fort Webster, 6,300 feet, and believed the species nested there. If so it must be very rare, for it has not been noted by any of those who have in late years collected extensively in that district.

It is an early fall migrant, and the last was seen at Ribera August 26, 1903 (Bailey); at Mesilla September 14, 1913 (Merrill); and at Apache September 15 (Anthony).

[In spring, at Silver City a specimen was taken on May 9, 1918 (Kellogg)].—W. W. COOKE.

NEST.—In bushes or saplings among briars, usually two or three feet from the ground; made largely of dry leaves and grasses, lined with finer grasses. *Eggs*: Usually 4, white, pinkish, or greenish, spotted or blotched over the entire surface, or wreathed around the larger end, with browns and shell spots of lavender.

GENERAL HABITS.—In 1903, we first found the large handsome Chat, with his yellow breast, white head marks, and olive back, in the adobe village of La Cuesta on the Pecos and were glad to hear his clownish laugh and foolish chatter again. From that time on we found him in the tangles of the rich cultivated Pecos bottoms along the line of Mexican pueblos to Ribera.

Wherever thick vegetation of some height is found near Mesilla Park, Professor Merrill says, "there this bird is, be it grove, thicket, bosque, hedge, or weed patch. He comes up late, about June 1, and proclaims his presence from then on until he leaves in the fall, although he is very shy of showing himself in the open. From the time he lets out his first whistle on arrival, until his wings *flutt, flutt, flutt*, the last time, carrying his bobbing tail out of sight on his bush to bush migration, he is the very incarnation of crazy antics, silly poses and mimic whistle, call, and song. But he can sing a clear, sweet little strain all of his own with no hint of mimicry if he will, and then he sits up trim and straight, a really beautiful little bird. It is a relief to see him thus after hearing his burlesque of the Mockingbird's mimetic ability, and seeing one of his aerial spasms" (MS). He is particularly musical, Mr. Ridgway says, on bright moonlight nights.

ADDITIONAL LITERATURE.—MILLER, O. T., Upon the Tree-tops, 88-102, 1897; A Bird Lover in the West, 43-51, 231-233, 236-250, 254-258, 1894.—TAVERNER, P. A., Bird-Lore, VIII, 131-133, 1906.

RED-FACED WARBLER: *Cardellina rubrifrons* (Giraud)

PLATE 1

DESCRIPTION.—*Male*: Length (skins) 4.6-5.3 inches, wing 2.6-2.8, tail 2.2-2.4, bill .3, tarsus .6-.7. *Female*: Length (skins) 4.4-5 inches, wing 2.5-2.8. *Adult male*: Face, throat, chest, and sides of nape bright red; crown and cheeks glossy black, nuchal patch (usually tinged with pink), wing patch, and rump white; rest of upper-

parts gray; underparts more or less tinged with pink; bill brownish. In fall, nape and rump often rose-tinged, back sometimes suffused with red (Chapman). *Adult female*: Often indistinguishable from male but usually slightly duller. Young in *juvenal plumage*: Upperparts grayish brown, crown browner, nape buffy, rump white, wings with two buffy bands; anterior underparts grayish brown, belly white, sides grayish or brownish.

RANGE.—Mainly in Transition Zone in mountains of southeastern Arizona and southwestern New Mexico, south through Mexico to highlands of Guatemala.

STATE RECORDS.—The Red-faced Warbler breeds in the mountains of southwestern New Mexico, north to the Powderhorn Canyon near the head of the Mimbres, where several were seen and collected May 24-25, 1906 (Bailey). [A nest with four well-incubated eggs was found on June 27, 1920, 25 miles southwest of Chloride, head of South Diamond, at 7,800 feet, where the birds were common (Ligon)]. It was found at Fort Bayard on July 16, 1876 (Brewster).

In the fall migration it was seen in the Animas Mountains at 7,200 feet on August 7, 1908 (Goldman); in the Gila National Forest, August 22-23, 1908 (Bailey); Carolina Divide, near Silver City, September, 1884 (Marsh).

In the spring, [one was seen on April 24, 1919, in the Black Range, 35 miles southwest of Chloride, at 7,000 feet, and one on April 19, 1919, on the G. O. S. Ranch about 35 miles northeast of Silver City at about 7,500 feet (Ligon). A specimen was taken on May 12, 1918, at Silver City (Kellogg).]—W. W. COOKE.

NEST.—On the ground, under a log, vine, or bunch of grass; made largely of fine straws, rootlets, strips of bark, leaves, and hair. *Eggs*: 4, white, spotted with reddish brown over the entire shell, most thickly around the larger end.

GENERAL HABITS.—In the breeding season the strikingly marked Red-faced Warblers are found from 7,000 feet upwards. In August, Mr. Henshaw found them on Mount Graham, Arizona, in flocks of ten or fifteen, among the pines and spruces. Their habits, he says, "are a rather strange compound, now resembling those of Warblers, again recalling the Redstarts, but more often, perhaps, bringing to mind the less graceful motions of the familiar Titmice. Their favorite hunting places appeared to be the extremities of the limbs of the spruces, over the branches of which they passed with quick motion, and a peculiar and constant sidewise jerk of the tail . . . but they are abundantly able to take their prey on the wing, and accomplish this much after the style of the Redstarts" (1875, p. 212).

PILEOLATED WARBLER: *Wilsonia pusilla pileolata* (Pallas)

PLATE 65

DESCRIPTION.—*Male*: Length (skins) 4.1-4.4 inches, wing 2.1-2.3, tail 1.8-2, bill .3-.4, tarsus, .7-.8. *Female*: Length (skins) 4.1-4.5 inches, wing 2.1-2.2, tail 1.8-1.9, bill .3-.4, tarsus 1-1.1. Bill (for flycatching) wide and flat, with conspicuous rictal bristles. *Adult male in spring and summer*: Crown glossy blue-black, forehead orange, rest of upperparts bright yellowish olive-green; wings and tail without white marks; superciliary and underparts vivid yellow; bill brownish black above, flesh-colored below. *Adult male in fall and winter*: Similar to spring male but black cap narrowly tipped with olive. *Adult female in spring and summer*: Sometimes not distinguishable from spring male, but usually with black cap less sharply defined and

conspicuously tipped with olive-green, yellow duller. *Young in juvenal plumage:* Upperparts hair-brown, breast lighter, belly white; wings with two brownish white wing bars.

RANGE.—Breeds in Boreal zones in Rocky Mountains region from northern Alaska south to New Mexico and Arizona (Coues); winters from Durango and Nuevo Leon to Panama.

STATE RECORDS.—The southernmost extension of the breeding range of the Pileolated Warbler is found in northern New Mexico. Here on July 23, 1903, it was found feeding young at 11,000 feet below Pecos Baldy (Bailey); and it undoubtedly spends the summer in the higher parts of the Taos and Culebra Mountains. [Seen up to 10,500 feet in the Sangre de Cristo Mountains. In Santa Fe Canyon, near Monument Rock, on June 5, 1921, a nest with five fresh eggs was found near a stream (Jensen).]

After the breeding season, early in August, it begins to descend. In 1883, in the northern part of the State, at Willis, 7,800 feet, the first was noted on August 8 (Henshaw); and by August 20, in 1889, it had passed to the southern part of the State at Cooney (Barrell). It was noted at the mouth of Mora Creek, August 18-20, 1903, on Santa Clara Creek, August 23, 1906, and in the willows of Costilla River, 9,400 feet, August 21-23, 1904 (Bailey); at Fort Stanton, August 28, 1908 (Tricks); in the higher San Mateo Mountains August 14, 1905 (Hollister); at Sawyer, August 15, 1911 (Dearborn); in the Mimbres Mountains, August 22, 1908 (Bailey); on Diamond Creek, August 24, 1908 (Birdseye); at Mesilla, August 31, 1913 (Merrill); and at Carlsbad, September 5, 1901 (Bailey). During September it is one of the common birds of the State and by the end of that month most of them have departed. The species was common, September 27-28, 1904, at Lake Burford, but not one was seen after the storm of September 29 (Bailey); it was still present at Santa Rosa, on October 1, 1902 (Gaut); Redrock, September 30, 1908 (Goldman); Gallinas Mountains, October 7, 1904 (Bailey); and at Cooney until October 9, 1889 (Barrell).

The first returning spring migrant was noted at Deming, April 20, 1885 (Mearns); at Fort Bayard, April 20, 1908 (Rockhill); at Carlisle, April 22, 1890 (Barrell); at Silver City, April 22, 1884 (Marsh); [a specimen was taken on April 30, 1917 (Kellogg)]; and at Rinconada, April 28, 1904 (Surber). It was seen until May 28, 1890, at Carlisle (Barrell); May 27, 1884, at Silver City (Marsh); and even on May 31, 1907, at Deming, probably because of the unusual cold in the mountains (Bailey). [Between Silver City and the Mexican boundary in Hidalgo County it was common, May 6-10, 1920, especially at Cow Spring and in the Animas Mountains (Ligon). At Lake Burford in 1918, during the spring migration, a few were seen (Wetmore).]—W. W. COOKE.

NEST.—On or near the ground, often in willow thickets; made of willow leaves, weed stems, and grasses. *Eggs:* Usually 4 or 5, white or creamy, specked and spotted with reddish brown and lavender over entire surface or wreathed around larger end.

GENERAL HABITS.—The black-capped, yellow-breasted Pileolated Warbler goes flitting about among the willows and alders, buzzing under a leaf, switching its tail, and flipping off with a flat, jerked out *chack*.

Breeding as this hardy Warbler does in northern Alaska as well as New Mexico, it is interesting to hear from Alfred Bailey that in the spring migration in southeastern Alaska, he found it the most abundant of Warblers.



From Handbook of Birds of the Western United States

PILEOLATED WARBLER

Vivid yellow below, cool green above, this pert little Warbler peers up at you from under his jaunty black cap with flattering curiosity; then with a switch of the tail flips off on more important business

In the willows at 11,000 feet below Pecos Baldy, where we found a pair feeding young the last week in July, an adult was already in the midst of its molt; and on September 17, at 8,800 feet on the mountains above Taos, the jaunty little migrants were common in the alders, some with black caps, some without. On September 23, 1904, at Horse Lake, they were flitting about in the oak brush, and on September 28, at the Burford Lakes, they were seen in the tules and found commonly in the cottonwoods. Wherever seen, when not too preoccupied, the little yellow beauty will stop to peer up at you from under his black cap with pert curiosity, whipping off with an air of saying "Whoever you are, it's all the same to me!"

ADDITIONAL LITERATURE.—SAUNDERS, A. A., *Condor*, XXVI, 209-213, 1924 (bird sounds).

GOLDEN PILEOLATED WARBLER: *Wilsónia pusilla chryséola* Ridgway

DESCRIPTION.—Like the Pileolated but slightly smaller and much brighter colored, upperparts much more yellowish, underparts more intense yellow.

RANGE.—Breeds in Upper Sonoran and Canadian Zones of the Pacific coast district from British Columbia to southern California; migrates to eastern Oregon, Arizona, New Mexico, Mexico, and Lower California.

STATE RECORDS.—A young female was taken by Ned Hollister, September 24, 1905, at Riley, Socorro County.—W. W. COOKE.

AMERICAN REDSTART: *Setóphaga ruticilla* (Linnaeus)

DESCRIPTION.—*Male*: Length (skins) 4.6-5 inches, wing 2.4-2.6, tail 2-2.3, bill .3-.4, tarsus .6-.7. *Female*: Length (skins) 4.4-4.8 inches, wing 2.3-2.6, tail 2-2.3, tarsus .6-.7. Bill broad at base, rectal bristles present. *Adult male*: Black, except for salmon or orange patches on sides of breast, wings, and tail, and white median underparts. (In winter plumage, feathers of throat and breast often with white tips, those of back with brown.) *Adult female*: Upperparts grayish olive, underparts white; orange of male replaced by pale yellow. (In winter plumage, throat and breast washed with buffy.) *Immature male*: Similar to adult female but colors deeper and in some specimens black feathers coming in on head and breast. *Young in juvenal plumage*: Upperparts grayish brown, underparts grayish white, pale gray on chest; wings and tail as in adults but wings with two white or pale yellowish bands.

COMPARISONS.—The long fan tail with its orange or yellow markings distinguish the Redstart in any plumage.

RANGE.—Breeds in Canadian, Transition, and Upper Austral Zones from north-central British Columbia, west central Mackenzie, southern Keewatin, northern Quebec, Labrador, and Newfoundland south to North Carolina, Alabama, central Oklahoma, eastern Colorado, northern Utah, and Washington; winters from Lower California, Mexico, and West Indies, to Ecuador and British Guiana; casual in Oregon, California, Lower California, Arizona, and northern Quebec.

STATE RECORDS.—The only records of the Redstart in New Mexico are those of a pair seen at Shiprock on May 27, 1907 (Gilman), and of a single bird taken at Kingston August 24, 1904 (Metcalf), now in the collection at Mesilla Park. The species breeds in Colorado and winters in eastern Mexico, so that it may occur as a migrant

in New Mexico more commonly than these few records would indicate.—W. W. COOKE.

NEST.—Usually in an upright crotch of a tree; gray, cup-shaped, compact, woven with plant fibers, spider web, inner bark, and grasses; lined with fine grasses and hair. *Eggs*: Usually 4, creamy, grayish, or greenish white, spotted chiefly around the larger end with brown and lilac.

GENERAL HABITS.—The handsome black and orange or salmon Redstart is one of the flycatching Warblers, and so is constantly on the wing chasing madly through the greenery, suddenly dropping as if shot, only to snap up its fly and dart off to begin its bewildering chase again. It has a variety of songs, one reeled off and accented at the end.

ADDITIONAL LITERATURE.—MILLER, O. T., *Little Brothers of the Air*, 48-60, 1892.—PEARSON, T. G., *Educational Leaflet* 86, Nat. Assoc. Audubon Soc.

PAINTED REDSTART: *Setophaga picta* Swainson

PLATE 1

DESCRIPTION.—*Male*: Length (skins) 4.8-5 inches, wing 2.7-2.9, tail 2.4-2.7, bill .3, tarsus .6. *Female*: Length (skins) 4.9-5.3 inches, wing 2.6-2.8, tail 2.4-2.5, bill .3, tarsus .6. *Adults*: Black, except for red of belly, and white of eyelid, wing patch, outer tail feathers, and under tail coverts. *Young in first plumage*: Sooty black, the belly more or less mixed with whitish, wings and tail as in adults.

RANGE.—Breeds in high Upper Sonoran and low Transition Zones in mountains of southern and central Arizona, western New Mexico, Coahuila, and Nuevo Leon, and south over mountains of Mexican tableland region, Vera Cruz, Oaxaca, and Guerrero to Guatemala and Honduras. Accidental in California.

STATE RECORDS.—From its main summer home in Mexico and Arizona, the Painted Redstart comes into western New Mexico. One was seen in June, 1909, at 9,100 feet, on the crest of the Zuni Mountains; (it is fairly common as far north as Monticello and Alma (Ligon, 1916-1918). A specimen was taken on May 10, 1924, on Walnut Creek in a mountain canyon, where the birds were apparently about to breed (Kellogg). A nest with three fresh eggs was found May 11, 1924, in the Animas Mountains, Hidalgo County, 32 miles south of Animas, at 7,500 feet (Ligon.) Judging by its habits in Arizona, it generally breeds in western New Mexico at 5,500-8,000 feet. It was seen in May, 1906, at 6,500 feet, on the Mimbres (Bailey); noted July 5-17, 1892, in the San Luis Mountains (Mearns); several seen July 26 to August 9 at 5,800-7,500 feet on Indian Creek in the Animas Mountains (Goldman); two, molting and evidently breeding birds, August 21, 1908, at 8,000 feet, on little Rocky Creek, and one August 23, on Diamond Creek, both in the Gila National Forest (Bailey); one August 31, 1886, at Apache (Anthony).

In the fall, they linger late, in the south. Several were seen September 20, 1908, 7,000-7,800 feet in the Burro Mountains (Goldman). The last one was noted at Cooney, September 19, 1889 (Barrell); and in the San Luis Mountains, September 29, 1893 (Mearns).

In the spring it arrives very early for a Warbler, since the first was noted on March 26, 1889, at Cooney (Barrell); and the species was common two days later. This is probably about an average date for the arrival. [Two were seen, April 2, 1920, 4 miles west of Chloride, on Chloride Creek, at 6,500 feet. Three were seen, April 19, 1919, on the G. O. S. Ranch, about 35 miles northeast of Silver City, near 7,500 feet.] It also was seen at Chloride on April 20, 1915 (Ligon).—W. W. COOKE.

NEST.—On the ground, preferably on a bank or hillside, usually beneath a projecting rock or bunch of grass; large, flat, and shallow, made of bark and coarse weed fibers, lined with fine grasses and a few hairs. *Eggs*: Usually 4, white, wreathed around the larger end with reddish brown and lavender-gray, with a few scattering dots.

GENERAL HABITS.—The handsome tricolored Painted Redstart is often found near waterfalls, in damp, shady canyons, during the nesting season; where, as Mr. Swarth says, "with wings and tail outspread, and feathers puffed out to show their beauties to the best advantage, he can be seen clambering over tree trunks or mossy rocks" (1904, p. 57).

One that Mr. Bailey found near his camp in the Mimbres Mountains, in the nesting season, as he wrote admiringly—"a beautiful Painted Redstart was taking a bath in the Mimbres River near its head," and he adds, "its white wing and tail patches were as conspicuous as its red throat and black coat" (MS).

Those seen by Major Goldman in the Burro Mountains in the fall were found "among the oaks and pines on the northeast slope from 7,000 feet to the summit. One was working over the face of a cliff, its location and motions suggesting those of a Canyon Wren" (MS).

At the foot of the Santa Rita Mountains in Arizona, when watching the spring migration and greeting old friends of the field, which brought us pleasant reminiscences of California and New Mexico, there suddenly appeared a new and wonderful bird to me, this spectacular, theatrical Painted Redstart, which comes up from Central America just far enough to reach the mountains of Arizona and New Mexico. Although three were the most we ever saw at a time, as I wrote, "one was enough to set agog both camp and ranch. Its black plumage, which in the sun had the exquisite silken sheen of that of the *Phainopepla* might well have been given its strikingly contrasted snowy wing patches and outside tail feathers as well as the appropriately rich carmine breast, by the careful hand of an artist deliberately painting a feathered masterpiece. What matter if the artist were Mother Nature working through long ages to produce masterpieces which should stand the test of time, in which plume and habit of life were so harmoniously adjusted that the race could not fail to be perpetuated. As if actually conscious that its protecting blackness would effectually hide it in the dense shadowy oak tops and as if knowing that at all hazards it must not be lost from its kind, it fairly flaunted its white plumes, going about with wings drooping to display their white patches and its long fan tail widely spread to exhibit the open shears of white. The white of the eyelid might also have had its use when two met in the shadows, but it seemed a trivial detail Nature had added gratuitously. Suppose the manner of carrying the wings and tail were best suited to effect sudden Flycatcher-like sallies after insects—is it then unusual for

Nature to make one device serve two ends? The actions of two seen among the live oaks of the ranch the last of March suggested courtship display. To be sure they may have been quite unregardful of each other's presence and their actions nothing out of the ordinary, but what flaunting of plumes, what mad chasing through the oaks, what incessant opening and closing of the white tail shears!

"In catching insects they often dropped through the air or made downward swoops in conventional Redstart and Flycatcher-manner, and once one dropped about twenty feet to catch on a hanging rope and then on a vine that swung with it prettily; but in the main they hunted in the sycamore and live oak tops and markedly and perhaps preferably on the great slanting trunks of the live oaks where the crevices of the bark seemed to supply a ready feast. Even in the mesquites, a Painted Redstart was seen flying from one trunk to another. On the oaks, when the long black and white fan tail was outspread against the bark the suggestion was of a museum specimen, a pinned-out gorgeous butterfly. Another interesting pose of the Redstart's suggesting a close scrutiny for insects was a forward tilt of the body with the black crest raised enquiringly.

"In hunting habits a combination of Redstart, Flycatcher, Creeper, and Sparrow, this individual bird may be seen hopping over the ground or hopping and flitting lightly up the side of a slanting tree. This surprising characteristic was illustrated one day at the ranch. After a tour of the live oaks, a sudden gleam of the rich carmine which glows under a stray sunbeam, together with a rich contralto call, announced the Redstart's descent to the corrugated iron roof of the old adobe ranch house. An apparently unexpected answer to his call from the mesquite overhead was greeted so joyfully that it seemed for a moment as if he would forget about dinner and fly to his comrade. But it was getting late and he must keep at work or go hungry to bed. So he proceeded to hunt over the roof, hopping from one corrugation to another on his short legs as a man walks ties, occasionally skipping one or making a misstep and dropping in between. He partly crossed the roof twice with his droll short-legged hops, picking up a few tidbits as he went. Another time, when two of the birds were seen hunting near together they separated, perhaps to keep to unworked territories.

"The rare pleasure of watching these unusual and fascinating Painted Redstarts was ours at intervals for nearly six weeks, for while they apparently went on up the canyon on warm days, they drifted back on cool days. Once one was reported to me by the ranchman's wife during a warm wave, and when I expressed my surprise she assured me that he was 'hopping around as happy as

he could be,' which expressed one's natural reaction to this gay little messenger of spring." (1923a, pp. 396-397).

MEADOWLARKS, BLACKBIRDS, ORIOLES, etc.: Family Icteridae

The Icteridae, an American family, in the Bobolink and Cowbird are closely related to the Fringillidae (Finches and Sparrows), sharing with them the character of angulated commissure, that is, cutting edges of bill with sharp angles near base. They also have peculiar palates adapted to their food habits (Wetmore, 1919a, pp. 190-197), and only nine developed primaries, a combination of characters that distinguishes them from all other North American families. Except for the Bobolink and the Cowbirds, whose bills are short and thick, their bills are long, acute, unnotched, unbristled, and have a wedge-like extension dividing the velvety feathers of the forehead. Except in arboreal Orioles, the feet are large and strong, fitted for terrestrial life, for walking instead of hopping, like most Finches and Sparrows. Leaving out the Meadowlarks, in most genera, black, or black and yellow or red prevail, and the sexes are strikingly dissimilar. All are migratory. Most are strictly monogamous and build elaborate nests, but the Cowbirds are polygamous, polyandrous, and build no nests, depositing their eggs in the nests of other birds.

[BOBOLINK: *Dolichonyx oryzivorus* (Linnaeus)]

DESCRIPTION.—*Male:* Length 6.3-7.6 inches, wing 3.7-4, tail 2.6-2.9. Bill finch-like; tail feathers with pointed tips. *Adult male in spring and summer:* Black, with cream or buffy patch on hind neck and buffy streaking on wings and foreparts of back; scapulars, lower back, and upper tail coverts grayish white; bill blue-black. *Adult female:* Upperparts olive-buff streaked with black, crown blackish, with buffy brown median stripe, nape finely spotted; underparts yellowish or buffy white, sides lightly streaked. *Adults in fall and immature:* Similar to female but buffier and more olivaceous throughout and streaking of upperparts blacker.¹

RANGE.—Breeds mainly in Transition Zone from southeastern British Columbia, central Saskatchewan, and central Manitoba, Quebec, and Cape Breton Island south to New Jersey, Ohio, Illinois, Utah, northwestern Nevada, and northeastern California (rare); winters in South America to southern Brazil, Bolivia, and Argentina. Migrates through eastern Colorado.

STATE RECORDS.—There is at present no specific record for the Bobolink in New Mexico, but it is a fairly common migrant in Colorado and birds on their spring and fall flights through that State must pass very close to the northeast corner of New Mexico, while the individual that was taken in spring at Bluff, Utah, had probably crossed New Mexico to reach Utah.—W. W. COOKE.

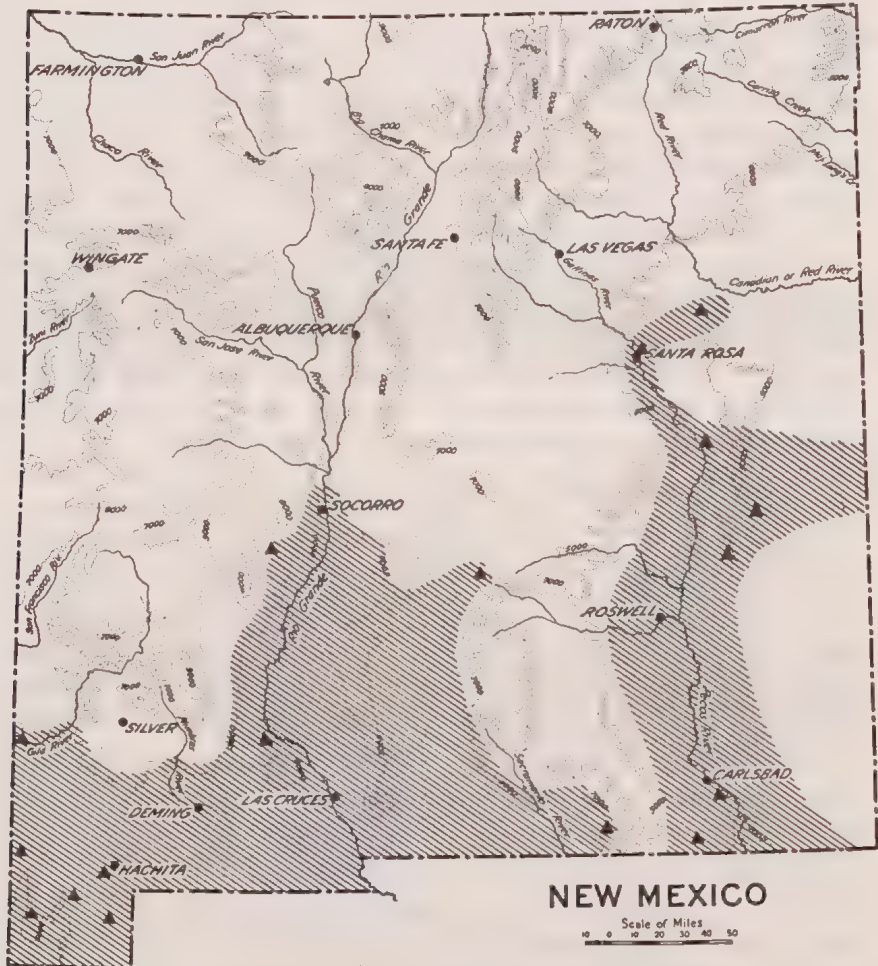
GENERAL HABITS.—As there is a possibility of seeing migrating Bobolinks in New Mexico in the fall, when the males have lost their black and white coats and assumed the yellowish brown, streaked "Reedbird" dress of the females, all flocks of yellowish brown, sparrowy-

¹ Chapman, F. M., Handbook of Birds of Eastern North America, Plate XX, p. 358, 1912.

looking birds should be watched closely, and the characteristic metallic *chink* of the Bobolink listened for.]

RIO GRANDE MEADOWLARK: *Sturnella magna hoopesi* Stone

DESCRIPTION.—*Male*: Length (skins) about 8-9 inches, wing 4.5-5, tail 2.5-3.1, bill 1.2-1.4, tarsus 1.5-1.7. *Female*: Length (skins) 7.7-8.1 inches, wing about 3.9-4.1, tail 2.5-2.8, bill 1.1-1.2, tarsus 1.4-1.6. Similar to the Western Meadowlark



MAP 54. RIO GRANDE MEADOWLARK
Shaded areas mark general range. Triangles mark summer records

(p. 639), but yellow of throat restricted, not encroaching on cheeks, jugular crescent wider, colors somewhat stronger, and the yellow very rich.

RANGE.—Resident in Lower and Upper Sonoran Zones of southwestern United States and northern Mexico, from northern Arizona, central New Mexico, and central Texas south into Tamaulipas, Coahuila, Chihuahua, and Sonora.

STATE RECORDS.—The Rio Grande Meadowlark, the southwestern form of the common eastern Meadowlark, is not common in New Mexico, but ranges across the southern part of the State and north to near Fort Sumner, September 25, 1902; southwestern foothills of the Capitan Mountains, July 1, 1903 (Gaut); and Rio Alamosa, September 29, 1909 (Goldman). It is more common in the extreme southwestern part of the State and was found fairly common April 9–28, 1913, on the Gila, near the Arizona boundary, 3,800 feet (Brooks); from July 16 to August 15, 1908, at Hachita, Playas Lake, and Lang Ranch, Animas Valley (Goldman). It was taken at Fort Thorn (Henry); and in the Guadalupe Mountains on August 9, 1901 (Fuertes). It is thus confined to the lower parts of the State from about 3,800 feet up to about 7,000 feet. [It was common in the valley at San Simon, Hidalgo County, May 9, 1920, one taken; common also in sand country, 30 to 50 miles south of Portales, and two specimens were collected about 40 miles south of Portales on May 18, 1925 (Ligon).]—W. W. COOKE.

GENERAL HABITS.—While the Rio Grande and the Western Meadowlarks can not be distinguished on the wing, the song of *hoopesi* is so distinct that it can be recognized instantly.

ADDITIONAL LITERATURE.—SAUNDERS, A. A., Condor, XVI, 139, 1914 (nest and eggs).

WESTERN MEADOWLARK: *Sturnella neglecta neglecta* Audubon

PLATE 66

DESCRIPTION.—*Male*: Length (skins) 8.3–10.1 inches, wing 4.7–5.2, tail 2.7–3.2, bill 1.2–1.4, tarsus 1.5–1.6. *Female*: Length (skins) 7.8–9 inches, wing 4.1–4.6, tail 2.4–2.8, bill 1.1–1.2, tarsus 1.3–1.4. Upper mandible strikingly flattened on top, extending wedge-like into feathers of forehead; nostrils scaled; feet large, hind toe with a long, curved claw; feathers of crown stiffish, bristle-tipped. *Adult male in summer*: Crown with median buffy stripe between blackish stripes mixed with grayish brown, adjoining yellow and buffy line over eye, and narrow black streak back of eye; rest of upperparts grayish brown, streaked with black and buffy white, and barred with black, especially on wings and tail, outer tail feathers mainly white; underparts yellow, with black jugular crescent and dark streaks on flanks; yellow of throat spreading onto cheeks. *Adult female in summer*: Similar but smaller and paler, with yellow and black restricted. *Adults in winter*: Upperparts lighter from unworn brown tips to feathers; underparts more buffy. *Young*: Colors dull, black crescent replaced by dusky spots.

RANGE.—Breeds in western North America from north-central British Columbia (probably), central Alberta, central Saskatchewan, and southern Manitoba south to central Texas, northern Mexico, and southern California; winters from southern British Columbia, Montana, and Nebraska south to Louisiana, southern Texas, Tamaulipas, Michoacan, Jalisco, and southern Lower California. Accidental at Fort Simpson in southwestern Mackenzie.

STATE RECORDS.—Throughout the lower parts of New Mexico, where there is grass enough for it to nest in, the Western Meadowlark is one of the common birds (Ligon). It nests in the hottest valleys, as at Carlsbad (Bailey), and Mesilla (Merrill); up on the lower slopes of the mountains to 8,000 feet; [on the open mesas northeast of Mount Taylor at about 8,000 feet (Ligon, 1916–1918)]; and on the mesa above Hondo Canyon, where young out of the nest were being fed by the parents, August 13, 1904 (Bailey). It also breeds at Halls Peak, 8,000 feet (Barber);

Fort Wingate, 7,000 feet (Hollister); Chloride, 7,500 feet (Blinn); and Silver City, 6,000 feet (Marsh). Eggs were found May 26, 1913, near Engle (Ligon). [It nests freely in June in the Jornada del Muerto (1916-1918); it was common in Grant [Hidalgo] County, when one young was seen with adults, May 7, 1920, near Gray Ranch; was common from Carlsbad to Cimarron, May 27-June 22, 1924, but especially north of Roswell, Salt Draw, and on portions of the Staked Plains (Ligon); it was fairly common at Lake Burford, where a nest with four eggs and two newly hatched young was found on June 11, 1918 (Wetmore). On the Rio Grande Gun Club grounds southwest of Albuquerque, June 16, 1919, it was abundant with young (Ligon).] Specimens were taken near Cuervo, June 14 and 21, 1903 (Bailey); at Espanola, June 11 and 14, 1904 (Surber).

After the nesting season, near Koehler Junction, it was common from July 28 to October 24, 1913 (Kalmbach). [Many were seen between Socorro and Albuquerque, August 28, 1917 (Ligon).] With the advent of fall migration they become more common and probably reach the height of their abundance during October and early in November, but they ascend little if any higher in migration than the upper limit of the breeding range. Specimens were taken at Arroyo Hondo, August 13, 1904 (Bailey); Roswell, September 17, and Horse Lake, September 22, 1902 (Gaut); Fair View, October 12, and Garfield, November 21, 1909 (Goldman); Silver City, October 22, 1912 (Kellogg); and Cactus Flat, November 6, 1906 (Bailey). [Two were noted near Zuni, October 4, 1916 (Skinner).] In Union County they were abundant November 5, 1915 (Ligon).

In winter, they are found in a few localities. [In Colfax County, Charles Springer is sure that they have been seen at all seasons, individuals remaining throughout some winters (1925).] They remain in the Rio Grande Valley at least as far north as Espanola (Loring). On Christmas, 1902, six were seen at Albuquerque (Harman). At the south end of the San Mateo Mountains they were very abundant September 7-10, 1915 (Ligon), and were the commonest birds observed in the Jarilla Hills during January, 1903 (Gaut). On the Carlsbad Bird Reserve they were common in the lower country in January, 1915, and were noted during the winter of 1915-16; [they were found abundant in December, 1916; and on the Rio Grande Bird Reserve (Elephant Butte), were noted November 23-December 9, 1916 (Willett).]

In spring, individuals that are to breed at the higher altitudes move out of the valleys in March, and have been recorded as arriving at Las Vegas March 19, 1902 (Atkins), and at Halls Peak on March 20, 1895 (Barber), at both of which places they became common the last of March.—W. W. COOKE.

NEST.—On the ground, made of dried grass, usually domed or loosely covered over. Eggs: Generally 4 to 6, white, or very rarely light green, speckled over the entire surface with browns and purple, usually heaviest around the larger end.

FOOD.—Vegetable 30 per cent and animal 70 per cent. Of the animal, almost 27 per cent is beetles, half of which consists of predatory ground beetles, the rest harmful or neutral, including the alfalfa and a number of other weevils; 12 per cent grasshoppers and crickets, for the year, and 42 per cent in August. (In Colfax County, July 28-October 24, 1913, grasshoppers were 75 per cent) (Kalmbach). About 15 per cent are lepidoptera, largely caterpillars, especially cutworms; nearly 6 per cent wasps and ants. One stomach contained 40 plant lice, parts of 8 ground beetles, 1 snout beetle, and parts of 12 crickets. Of the vegetable food, weed seed is 2 per cent, and grain 27.5 per cent, oats being the favorite kind, eaten mainly from August to March, the greatest quantity waste grain in September and January, the least in March, the month of seeding. Refuse wheat was eaten from October to January. From April to July, which cover the ripening and harvesting of the crop, no grain except a little corn was eaten. "Its services are sufficiently real and im-



From Biological Survey

WESTERN MEADOWLARK

The golden-fronted musician raising his rapturous song to the sky



portant to earn protection wherever it is found" (Beal). In winter it "hunts out the egg pods of the grasshoppers" (Merrill). At this season it is "a valuable asset as a destroyer of hibernating insects, especially the alfalfa weevil" (Kalmbach). When coulee crickets were devastating fields near Adrian, Washington, Meadowlarks appeared in great numbers and fed upon the crickets so effectively that the 1919 campaign against crickets was abandoned (Burrill).

GENERAL HABITS.—An occasional Western Meadowlark, as E. A. Preble tells us, "pushes northward in spring far beyond the regular range," and in northern British Columbia has been found actually in Hudsonian Zone. His explanation of its appearance is suggestive and interesting in view of other apparent zonal irregularities that puzzle the student. As he says, "Although one has difficulty in picturing the Meadowlark as a summer inhabitant of Hudsonian Zone valleys tenanted by breeding Willow Ptarmigans and Golden-crowned Sparrows, yet from the standpoint of one on the ground, the surroundings seem not necessarily uncongenial. During June and July, owing to the long hours of sunlight, the days are warm, often hot, and the nights are too short to become very cool. Herbaceous vegetation, with its accompanying insect life, is abundant, and there would seem to be no insuperable obstacle to the breeding of a comparatively hardy bird like the Meadowlark, any more than in the case of the Western Chipping Sparrow, whose nests were found within a few miles" (1926, p. 96).

In New Mexico, open country and water seem to be the Meadowlark's two requirements. When, in traveling over the arid plains, a water tank comes in sight, the sight is likely to be followed by a stirring sound, a strain of rare song from a ground-colored bird flying on outstretched wings, beating and soaring, to finally sail down to a patch of green. As he soars and sails with wings and white-bordered tail outspread, the white flags point his course, but when he drops to the ground, where his brown body, well camouflaged with its broken markings, disappears against the ground, his white-bordered tail closes to a narrow black-barred band of brown and he is lost to view, greatly to the bewilderment of pursuing enemies. While this upper exposed part of his plumage is strictly utilitarian, when he turns his breast to his mate she sees a rare object of beauty—his golden front with its adorning jet black necklace.

In the nesting season Mr. Ligon has found Meadowlarks at suitable places all over the Pecos Valley, but most commonly along river and creek valleys where the salt grass grows, becoming green during even the driest seasons. In the fall migration at our Laguna camp, where there were water holes and a broad meadow full of grasshoppers, a number of the birds were feeding during our stay. Ten were counted at one time, and parts of their spring song were heard at intervals

all through the day. Other migrating Meadowlarks were met with later on Cactus Flat, where they were singing delightfully. At sunrise they flew across into the first sunshine, one of them flying to the tip of a yucca flower stalk just after the sun reached it.

In January, when Mr. Gaut found them the most numerous birds in the Jarilla Hills, small flocks were seen in company with Mourning Doves, traveling up and down a small mining railroad track, probably picking up gravel and weed seed.

They are resident at Mesilla Park, and Professor Merrill wrote appreciatively, "the Western Meadowlark's clear note is a charm of the winter. Nesting in April and May," he says, "the old and young collect in small flocks from mid-August on. At this time their call is so often heard that the Mockingbirds take it up, but have to practice a long time before they master the artful note-whipping of the finale. However, they do get it so one can tell the difference only by the timbre of the voices. It is amusing indeed to see a string of a dozen or so Meadowlarks and two or three Mockingbirds seated on a wire and hear all giving the same call" (MS).

Along the San Juan River, where, in October and November, Mr. Birdseye found the Meadowlarks in alfalfa fields, river bottoms, orchards, grain fields, and weed patches, they were still singing. "In the early morning," he wrote with enthusiasm, "when the volume of their varied song fairly filled the air, it was one of the most beautiful sounds it has ever been my privilege to enjoy" (MS).

Their song is indeed one of the most stirring and soul satisfying of all our bird songs. As Mrs. Olive Thorne Miller said of the full rich outpouring—"The whole breadth and grandeur of the great West is in this song, its freedom, its wildness, the height of its mountains, the sweep of its rivers, the beauty of its flowers—all in the wonderful performance" (1894, p. 33).

ADDITIONAL LITERATURE.—BOWDISH, B. S., Educational Leaflet 3, Nat. Assoc. Audubon Soc.—MILLER, O. T., Upon the Tree-tops, 191, 1897.—MYERS, H. W., Educational Leaflet 111, Nat. Assoc. Audubon Soc.—SAUNDERS, A. A., Auk, XLI, 242-259, 1924 (individual bird songs).—THOMS, C. S., Bird-Lore, XXVI, 315-317, 1924 (nests).

YELLOW-HEADED BLACKBIRD: *Xanthocéphalus xanthocéphalus* (Bonaparte)

PLATE 67

DESCRIPTION.—*Male:* Length about 10.6-11.1 inches, wing 5.6-5.8, tail 4.5-4.8. *Female:* Length about 9-10 inches, wing 4.4-4.6, tail 3.5-3.7. *Adult male in summer:* Head, neck, and long, pointed front, yellow or orange; region around base of bill and eye, black; rest of plumage black, except for a white patch on the wing. *Adult male in winter:* Similar, but yellow of crown and hind neck obscured by dusky tips to feathers. *Adult female:* Upperparts dark brown, without white patch on wings; line over eye, cheeks, chin, and throat dull whitish, usually tinged with yellow and passing

into *yellow on chest*; breast broadly streaked with white; bill dusky brownish. (In winter all the yellow areas are deeper and the plumage is generally darker.) *Young in juvenal plumage*: Head and breast brown or buffy, giving the effect of a brown-headed bird; abdominal region whitish and back blackish, both more or less edged with buff; tail and wings black, wing-coverts tipped with white.

RANGE.—Breeds from southern British Columbia east of the Cascades, southwestern Mackenzie, northern Saskatchewan, northern Manitoba, Wisconsin, and northwestern Indiana south to eastern Kansas, western Texas, northern New Mexico, southwestern Mexico, Arizona, and southern California; winters from southwestern California, southern Arizona, southeastern Texas (rarely), and southwestern Louisiana south to Puebla, Michoacan, and Jalisco. Recorded from James Bay and casual in Atlantic States; accidental in Alaska, Greenland, Quebec, and other localities.

STATE RECORDS.—In the breeding season the Yellow-headed Blackbird has a limited and very local range in New Mexico. The peculiar conditions required for a satisfactory nesting site are not common in the State, but wherever they occur the bird may be expected from the northern parts south to Carlsbad (Bailey), Fort Fillmore (Henry), and Apache (Anthony). It also breeds at Zuni (Henshaw), Laguna (Coues), Albuquerque (Bailey), and at the lakes of Rio Arriba County, thus nesting from 3,500–7,700 feet. Young out of the nest but still being fed by the parents were abundant at Lake Burford on July 17, 1915 (Ligon). [At Lake Burford in 1918 it was estimated that there were 210 pairs, and by May 28, 1918, nest building was going on everywhere (Wetmore). In northern Santa Fe County flocks are often seen in the spring, and it is believed that they breed in a swamp along the Rio Grande (1922). They were found nesting in willows along the river near the Santa Fe Indian School, June 18, 1924 (Jensen).] Near Mesilla there is a tule-filled marshy sink where vast numbers breed (Merrill).

In the fall it is much more widely distributed; it was seen between Socorro and Albuquerque, August 12, 1912 (Ligon); a few were seen late in August, 1913, near Koehler Junction, and a specimen was taken, September 4, 1913 (Kalmbach). It ascends into the lower mountains to 8,000 feet at Black Lake, September 10, 1903 (Bailey), and to 7,500 feet at Beaver Lake, August 26–27, 1908 (Birdseye). Most leave the northern part of the State in September. But a few were still present near Gallup, September 28, 1908 (Birdseye), and a few near Redrock, October 3, 1908 (Goldman). The last one seen in 1905 in the Jornada was on October 1 (Ligon); and a single bird was seen at Santa Rosa October 6, 1902 (Gaut).

In winter, it is rare in the State. [In Colfax County, Charles Springer is sure individuals have been seen at all seasons of the year, and some have remained throughout some winters (1925).] But the lower Rio Grande Valley and possibly



Photograph by Robert B. Rockwell

FIG. 112. Nest of Yellow-headed Blackbird

the Carlsbad section of the Pecos Valley are the only parts of the State where Mr. Ligon thinks they remain regularly throughout the winter.

In the spring migration, most of the flocks pass through the State in April; a specimen was taken at Silver City, April 12, 1914 (Kellogg). Some exceptionally early birds were seen during February of 1876 at Socorro (McCauley); and February 16, 1901, at Rincon (Barber).—W. W. COOKE.

NEST.—A large thick-walled basket made of dried weeds and marsh grasses woven together, lined with finer grasses, and hung from growing reeds or cat-tails in marshes well above the water. *Eggs*: Usually 4, from grayish white to greenish white, profusely blotched and speckled over the entire surface with browns and neutral tints, generally heaviest about the larger end; occasionally with a few fine hair-like markings.

FOOD.—About a third animal matter and two-thirds vegetable. Of the animal matter, nearly a third is composed of insects harmful to vegetation, including the army worm, alfalfa weevil, and grasshoppers. The vegetable food is made up of grain and weed seed; grain, including oats, corn, and wheat, partly waste, amounting to more than one-third of all the food. The Yellow-head does not attack fruit or garden produce, feeding principally upon insects, grain, and weed seed, doing much good by eating noxious insects and troublesome weeds, but, when too abundant, becoming a menace to grain.

GENERAL HABITS.—On his breeding grounds in the tule marshes or marsh-bordered lakes, the handsome yellow-headed and yellow-vested Blackbird is a striking figure, centering the attention upon himself while his duller mate passes by with little notice, as Nature wisely provides, for the safety of the family.

While they generally frequent the same marshes as the Red-wings, Mr. Ridgway says, the two usually congregate in colonies in separate portions of the marsh (1877, p. 502).

At Lake Burford and the small adjoining lakes where in the summer of 1918 Doctor Wetmore found the birds assembled, he says, "Their colonies were always noisy; strange cat-calls, drawn out wailing notes, and chattering protests came to my ears constantly in the rushes below camp . . . The ordinary song . . . was subject to much variation but usually resembled the syllables *klee klee klee ko-kow-w-w*, the last low and much drawn out. The ordinary call-note of the males was a liquid *cluck*, somewhat unlike the call of any other Blackbird, while the call of the female was more Red-wing like" (1920a, p. 403).

In a nesting colony of some two hundred pairs, the adult males were in large part settled on their breeding grounds on Doctor Wetmore's arrival, May 23, though many were not yet mated. "Each selected a stand in the tules at the border of the lake and unless away feeding was certain to be found in the immediate vicinity constantly from that time on. At this season the male "seems fully conscious of his handsome colorings and in his displays makes every effort to attract attention. In the most common display the male started towards the female



From Handbook of Birds of the Western United States

YELLOW-HEADED BLACKBIRD

At home in the marshes

from a distance of thirty or forty feet with a loud rattling of his wings. As a preliminary the head was then bent down, the feet lowered and the tail dropped while he flew slowly toward his mate. The wings were brought down with a slow swinging motion and were not closed at all, so that the white markings on the coverts were fully displayed, the whole performance being reminiscent of a similar wing display of the Mockingbird."

By May 28, nest-building was going on everywhere, the females doing all the work. "The nests examined were all suspended in growing clumps of green tules (*Scirpus occidentalis*) over water from one to three feet deep and were in danger of being overturned by the unequal rate of growth of the stems, which frequently thrust one side of the nest high above the other. The adults seemed to take no steps to alter this condition beyond constructing their baskets with deep cup-shaped hollows to hold the eggs in if possible" (1920a, pp. 403-404).

In a Minnesota breeding colony studied by Dr. T. S. Roberts, the nests were hung two or three feet above the water and made of water-soaked grass blades, which, being soft and pliable, were easily woven, and when dry contracted and made a compact, firm, and securely attached basket-nest. So much experience, skill, and judgment were required in the selection of material and site that, out of sixty-two nests, twenty-eight were abandoned, almost all because of some fault of construction or situation (1909, pp. 371-389).

In New Mexico during the fall migration, September, 1901, large mixed flocks of Cowbirds, Red-wings, and Yellow-heads often stopped in the cottonwoods on the Bolles Ranch, near Carlsbad, where we could observe them, and on the morning of the eighteenth thousands of Yellow-heads suddenly appeared, filling the trees and barbed wire fences, and making a loud clamor. After a short rest they rose to fly on, their white wing patches flashing out so clearly that no mistake could be made as to the clan one was joining.

From Mesilla Park, Professor Merrill wrote, "The Yellow-headed Blackbirds are resident as a rule, but the exceptional cold in the winter of 1912-13 sent a good many of them farther south for a few weeks . . . vast numbers of them nest a short way southwest of Mesilla Park in a tule-filled marshy sink. From there they spread out on the alfalfa fields by the thousands and are entirely successful in keeping the grasshoppers under control. In fall they gather in huge flocks and fly about wherever food may be found, being perfectly at home in any corral or field. It is then they go out upon the mesa, feeding in true rotating fashion upon the seeds they may find. In spring they are accused of taking sowed grain. Their summer's work makes up for this, however. While nothing can be more raucous than the note

of a single individual, the united voices of a few hundred . . . produce an effect very pleasing, if not strictly harmonious" (MS).

ADDITIONAL LITERATURE.—ROBERTS, T. S., Educational Leaflet 57, Nat. Assoc. Audubon Soc.

SONORA RED-WING: *Agelaius phoeniceus sonoriensis* Ridgway

PLATE 68

DESCRIPTION.—*Male:* Length (skins) 8.2–9.3 inches, wing 4.8–5, tail 3.4–4, bill .9, depth at base .4, tarsus 1.2. *Female:* Length about 6.8–7.9 inches, wing 3.8–4.2, tail 2.9–3.2, bill .7–.8, depth at base .4, tarsus 1–1.1. *Adult male:* Black except for



MAP 55. RED-WINGED BLACKBIRDS

1. Nevada Red-wing. 2. Sonora Red-wing.

Shaded areas show general breeding range. Triangles mark breeding and breeding season records

scarlet epaulettes bordered with buffy or brownish. *Adult female:* Plumage of harsh texture compared with silky plumage of male. Upperparts brown, finely streaked, buffy tints prevailing, crown with median line, and stripe over eye, buffy; side of



From Biological Survey

RED-WINGED BLACKBIRD (*Agelaius phoeniceus phoeniceus*)

His red epaulettes are thrown out in striking contrast to his glossy black coat in courtship attitudinizing

head with dark brown streak; shoulders faintly tinged with red; underparts coarsely streaked with wide whitish and narrow dusky lines, throat and chest more or less suffused with pinkish buff. *Young in juvenal plumage:* Similar to adult female, upperparts brownish black margined with buffy or rusty, underparts broadly streaked with black and buff.

RANGE.—Breeds in southeastern California (Lower Colorado Valley), southern Arizona, and southwestern New Mexico south over coastal plain of Sonora to Tepic. Recorded from Lower California in migration.

STATE RECORDS.—Specimens of *sonoriensis* were taken in the Animas Valley at 5,000 feet, August 9, 1908 (Birdseye); August 10, 1908 (Goldman); and at Chloride, May 9, 1913 (Ligon). [At Palomas Springs near Elephant Butte, May 19, 1916, several pairs, probably of this subspecies, were nesting, with two half completed nests and one nest with two fresh eggs (Ligon).]

THICK-BILLED RED-WING: *Agelaius phoeniceus fortis* Ridgway

DESCRIPTION.—*Male:* Length (skins) 8.3–9.5 inches, wing 4.9–5.2, tail 3.5–4.1, bill .8–1, depth of bill at base .5–.6. *Female:* Length (skins) 6.8–7.7 inches, wing 4–4.3, tail 2.8–3.2, bill .7–.8, depth of bill at base .4–.5. *Adult male:* Not readily distinguished from male of *sonoriensis* except by size and proportions. *Adult female:* Similar to female *sonoriensis* but larger, bill heavier.

RANGE.—Breeds from Wyoming east to central Nebraska and south to northwestern Texas and Colorado. It occurs in migration at least east to Minnesota, and winters south to New Mexico, southern Texas, and Louisiana.

STATE RECORDS.—The Thick-billed Red-wing is the common breeding bird of Colorado south to the San Luis Valley and at least almost to the New Mexico line. There is as yet no sure record of the breeding of this form in New Mexico, but, of course, it must be common there in migration and winter. On the Carlsbad Bird Reserve it was noted in December, 1916 (Willett). Identified specimens are available from Las Vegas Hot Springs, December 15, 1882 (Batchelder); Aztec, December 5, 1893 (Loring); and Socorro, January 16, 1899 (Harris).—W. W. COOKE.

FOOD.—Caterpillars, aquatic and ground beetles, aquatic flies and spiders, but near alfalfa fields, especially alfalfa weevils (over 40 per cent in June). Its greatest value as an alfalfa weevil destroyer is that "it is among the earliest of the weevil-eating migrants, often preying on these insects when snow is still on the ground" (Kalmbach).

ADDITIONAL LITERATURE.—SAUNDERS, A. A., Condor, XVI, 136, 137, 1914 (nest and eggs).

NEVADA RED-WING: *Agelaius phoeniceus nevadensis* Grinnell

DESCRIPTION.—*Male:* Length (skins) 7.8–9 inches, wing 4.6–5, tail 3.4–3.8, bill .8–.9, depth at base .4–.5, tarsus 1.1–1.2. *Female:* Length (skins) 6.6–7.6 inches, wing 3.8–4.1, tail 2.6–3.1, bill .7–.8, bill at base .4–.5, tarsus .7–1.1. Like *sonoriensis* but smaller, the adult female darker above with streaks less strongly contrasted, and below with streaks broader and grayer. In winter with little if any rusty on upperparts.

RANGE.—Breeds from eastern British Columbia, Washington, Idaho, and Wyoming south to western Texas, New Mexico, and Arizona; winters south to Chihuahua.

STATE RECORDS.—[The Nevada Red wing is abundant over the full length of the Rio Grande in New Mexico and in suitable places all over the State up to 8,000 feet. Abundant, May 27, 1924, in the Rio Grande Valley, from Albuquerque to Belen, and

rather common, June 19, 1919, about Taos (Ligon). In northern Santa Fe County, common, nesting in willows along the rivers (Jensen, 1923).] It has been found breeding at Los Pinos (Coues); Fort Wingate (Hollister); Lake Burford, Lake La Jara, Taos, Santa Rosa, and Roswell (Bailey); Carlsbad (Dearborn); and Beaver Lake (Birdseye). The breeding season is considerably extended. Although it begins so early that young were already out of the nest on June 18, 1905, at Fort Wingate (Hollister), an adult male was carrying food to young on August 13, 1910, at Carlsbad (Dearborn). [At Lake Burford a nest with four eggs was found, June 14, 1918 (Wetmore). At the lakes of the Rio Grande Gun Club, southwest of Albuquerque, June 16, 1919, two nests with fresh eggs and many young were seen. In the Pecos Valley between Roswell and Fort Sumner, June 16-21, 1918, they were observed at several places. They were common in the marshes about Salt Draw and on the farms and ponds in the vicinity of Roswell. A male and two females were breeding near the river 15 miles south of Fort Sumner (Ligon).]

In the fall, specimens were taken at Carlsbad, September 11, 1901 (Bailey); and September 12, 1902 (Gaut).

Red-wings, also presumably of this subspecies, winter abundantly throughout the lower parts of New Mexico especially near the Rio Grande from Albuquerque (Loring) to Mesilla (Merrill), and one was taken at Las Vegas Hot Springs on December 23, 1882 (Batchelder). [In Colfax County, Charles Springer is sure Red-winged Blackbirds have been seen at all seasons, some remaining throughout some winters (1925).] Several were seen on the Tularosa River, 7 miles southwest of Aragon, Socorro County, about 7,000 feet, in zero weather, December 14, 1915 (Ligon).

In the spring, specimens were taken, March 9 and 13, 1904, at Cieneguilla, and April 28, 1904, at Rinconada (Surber). [In Grant County, May 6-10, 1920, females were observed commonly from Silver City to the Mexican boundary, but males were seen only at the San Simon marshes, May 9, 1920 (Ligon).]

Individuals, presumably of this subspecies, were seen at Willis, at 8,500 feet, in spring (Birtwell); in the Hondo Valley at 8,000 feet, August 12, 1904, and at nearly the same altitude, September 5-10, 1903, at Guadalupita (Bailey). Apparently it does not occur at much higher altitudes.—W. W. COOKE.

NEST.—Attached to upright stems of sedges or reeds, or to branches of bushes or small trees in swamps or marshes; a bulky structure, made usually of rushes, sedges, marsh grass, or strips of bark, lined with finer grasses, sometimes hair, and occasionally snake skin. *Eggs*: Usually 3 or 4, pale bluish, greenish, or grayish, fantastically dotted, blotched, clouded, and scrawled over with dark brown and paler or purplish shell-marks.

FOOD.—In the various forms of Red-winged Blackbirds, insects constitute practically one-fourth and include beetles (largely weevils, a most harmful group), 10 per cent; grasshoppers, 5 per cent; caterpillars (among them the destructive army worm), 6 per cent; together with ants, wasps, bugs, flies, dragon flies, and spiders. The vegetable food consists of some small fruits and seeds, including grain, of which oats is the favorite. When in large flocks the Red-wing is capable of doing great harm to grain. In some regions it does good by eating the larvae of the European corn borer.

GENERAL HABITS.—The handsome Red-wing, of whatever subspecies, is one of the most attractive of marsh birds, whether, for the benefit of his dingy, streaked mate, he is spreading his tail and raising

his shoulders till his epaulettes "blaze with scarlet color"¹; their color flaming in contrast to his jet black coat, or whether, fancy free, he is swinging on a tule, when, as the poets have it, he "flutes his *O-ka-lee*."

When seen in flocks after the nesting season, the Red-wings may excite admiration or dismay according to the particular objects of their attention or the especial interests of the neighborhood. In Farmington, in the fall of 1908, Mr. Birdseye found large numbers alighting in the village streets, where they were quite tame and were doubtless looked upon with interest by the community; but outside they were said to join with the Brewer Blackbirds in attacking the grain, when, quite naturally, they would be abhorred by the farmer. In October and November, flocks were noted at Fruitland, Liberty, and Shiprock. At La Plata, in December, 1893, flocks of thousands were seen by Mr. Loring "feeding in the weeds and underbrush along the river banks and in the meadows. They were always in company with the Brewer Blackbirds and nine-tenths of them were males."

From Mesilla Park, Professor Merrill wrote of the Nevada Agelaius—"This Red-wing is resident here but many absented themselves for a while the winter of 1912-13 during exceptional cold. Nearly always the Red-wing is found associated with the Yellow-heads, whether breeding or flocking, but it also breeds in any small bit of reedy place that is too small to suit the Yellow-heads. For this reason it is more commonly distributed over the valley in summer. By the first of August, after the family is well reared, the flocking begins. The food and feeding habits are practically the same as those of the Yellow-headed Blackbird and they are similarly accused. The stomachs of some taken this summer near wheat fields showed some wheat but mainly grasshoppers and seeds of weeds. One great benefit from them is that they descend in large flocks upon the sunflower patches and eat quantities of the seed; as they eat they sit on the pedicel steadying the heads with their feet" (MS).

ADDITIONAL LITERATURE.—HERRICK, F. H., *Home-Life of Wild Birds*, 20-21, 112, 1901.—PEARSON, T. G., *Educational Leaflet 25*, Nat. Assoc. Audubon Soc.

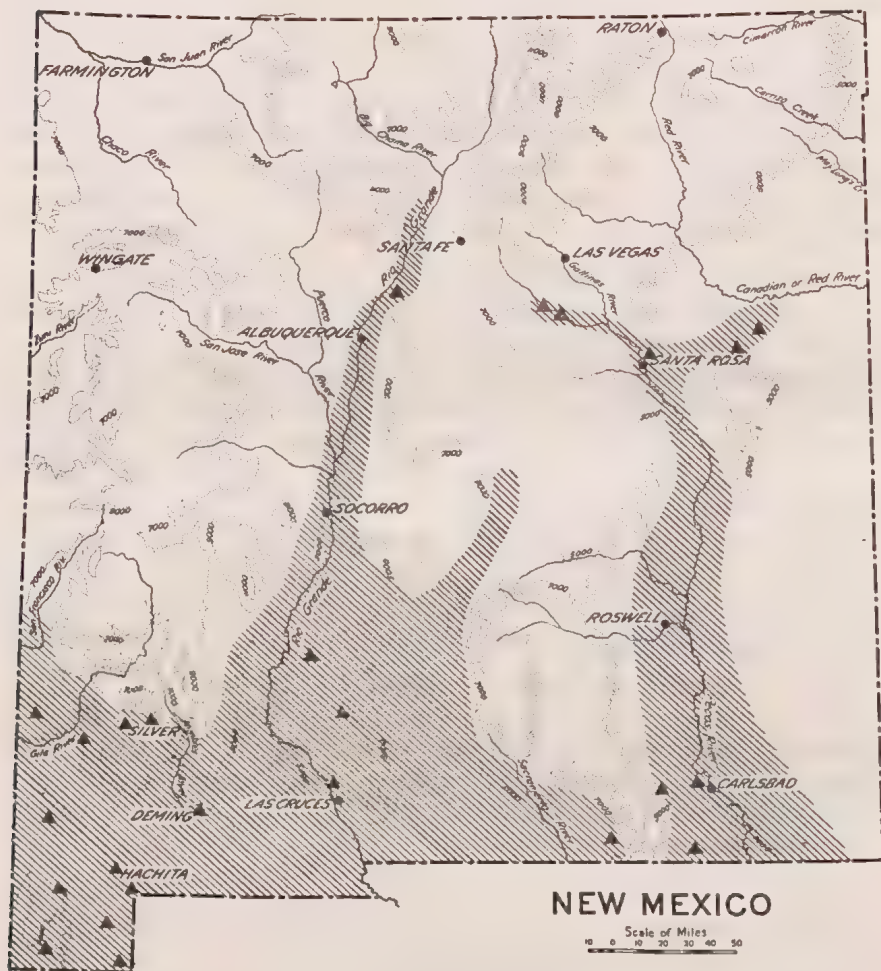
SCOTT ORIOLE: *Ícterus parisorum* Bonaparte

PLATE 69

DESCRIPTION.—*Male*: Length about 7.7-8.5 inches, wing 3.9-4.2, tail 3.3-3.9, bill .9-1, tarsus .9. (Female averaging smaller than male.) Bill long, slender, acute, feet fitted only for perching. *Adult male in spring and summer*: Black, except for bright lemon-yellow of scapulars, posterior parts of back, basal part of tail, upper and under tail and wing coverts, and white of median underparts and markings on wings and tail. Bill black with bluish gray base above. *Adult male in winter*: Similar to summer male but white markings on wings broader, feathers of back more or less edged with gray; rump and upper tail coverts more strongly washed

¹ Townsend, C. W., *Courtship in Birds*; Auk, XXXVII, 380-393, 1920.

with olive or gray; flanks tinged with olive. *Adult female:* Upperparts olive-gray, top of head and back streaked with darker, becoming yellowish on rump and upper tail coverts; tail olivaceous; wings crossed by two white bars; throat sometimes spotted or clouded with black, underparts greenish yellow, median portion clear yellow. *Young in juvenal plumage:* Olive-green above, yellower below, without trace of black.



MAP 56. SCOTT ORIOLE

Shaded areas show general range. Triangles mark breeding and breeding season records

RANGE.—Breeds mainly in Lower Sonoran Zone from southern California, southern Nevada, southern Utah, central New Mexico, and central-western Texas south to Nuevo Leon, Vera Cruz, Puebla, and Lower California; winters in Mexico from Lower California, Sonora, and Chihuahua south to Oaxaca.

STATE RECORDS.—The Scott Oriole is found in the lowest and hottest parts of New Mexico, as at Carlisle (Barrell), and Silver City, 6,000 feet (Fisher). [Two were taken May 10, 1920, 20 miles southwest of Silver City (Kellogg); one May 8,



SCOTT ORIOLE

MALE

FEMALE

with olive or gray; flanks tinged with olive. *Adult female:* Upperparts olive-gray, top of head and back streaked with darker, becoming yellowish on rump and upper tail coverts; tail olivaceous; wings crossed by two white bars; throat sometimes spotted or clouded with black, underparts greenish yellow, median portion clear yellow. *Young in juvenal plumage:* Olive-green above, yellower below, without trace of black.



MAP 56. SCOTT ORIOLE

Shaded areas show general range. Triangles mark breeding and breeding season records

RANGE.—Breeds mainly in Lower Sonoran Zone from southern California, southern Nevada, southern Utah, central New Mexico, and central-western Texas south to Nuevo Leon, Vera Cruz, Puebla, and Lower California; winters in Mexico from Lower California, Sonora, and Chihuahua south to Oaxaca.

STATE RECORDS.—The Scott Oriole is found in the lowest and hottest parts of New Mexico, as at Carlisle (Barrell), and Silver City, 6,000 feet (Fisher). [Two were taken May 10, 1920, 20 miles southwest of Silver City (Kellogg); one May 8,



SCOTT ORIOLE

MALE

FEMALE

1920, at north end of Animas Mountains; and it was also observed on the slopes of the mountains (Ligon).] Noted in the Sandia Mountains, 6,000 feet (Nelson, 1891, pp. 237-238); Santa Rosa (Bailey); Anton Chico (Ligon); and east to Montoya, Carlsbad, and Guadalupe Mountains (Bailey). In the Guadalupe it was seen from 5,500 to 6,800 feet, and a nest was found at the higher elevation, while old birds were noted feeding grown young on July 27, 1901, at Carlsbad. [It was found breeding rather commonly in the yuccas of the Jornada from Las Cruces to Engle along the west slope of the San Andres Mountains (Ligon, 1916-1918).] Thus it breeds from 3,500 to 6,800 feet, but most commonly between 5,000 and 6,000 feet.

It leaves the State during the winter and returns in April; the first were seen at Carrizalillo Mountains, just south of the boundary, April 18, 1892 (Mearns); at Apache, April 26, 1886 (Anthony); and at Carlisle, April 22, 1890 (Barrell).—W. W. COOKE.

NEST.—Pendant, woven largely of palm and yucca fibers, and hanging from yucca leaves; but also made of grasses and hung from branches of other low trees including junipers; sometimes built hidden in clumps of mistletoe; occasionally lined with a few horse hairs. *Eggs*: Usually 3, pale blue, blotched, streaked, and spotted, chiefly about the larger end, with black, gray, or brown and purple.

FOOD.—Mainly grasshoppers, small beetles, caterpillars, butterflies, larvae, and berries and fruits.

GENERAL HABITS.—The handsome Scott Oriole, with his strikingly contrasted lemon and black plumage, especially grateful to the eye in the dull-colored, midsummer landscape of the semi-desert regions, is one of the most attractive birds one meets there. It seems a strange place for an Oriole, but the flowers of the agave and tree yucca and many others assure him numerous insects, and bayonet leaves afford fiber for his hanging nest. In an open desert canyon back of the Pecos River near Carlsbad we found a family, the strongly marked father going about feeding a brood of grown, dingy greenish young. Singing at his work, he gave catches of a song surprisingly suggestive of that of a Meadowlark, with its richness and serenity. Another, in a juniper valley at the foot of the Staked Plains—a male which had not reached the full, adult plumage—was going about with his mate trolling over a jerky phrase with marked emphasis, suggesting a *ju'-niper val'-ley*, a *ju'-niper val'-ley*. He also sang a real Oriole song, however, which sounded strangely from one in his youthful habiliments.

In the Huachuca Mountains, Arizona, where Mr. Swarth found the Scott an abundant summer resident, he found young males in every stage of plumage, from those absolutely indistinguishable from some females up to the fully mature male, and he inferred that at least two years must be required to reach the perfect plumage. In the spring migration, he found, the old, bright plumaged males came first, followed by the females and later still by the immature males.

The Scott was the commonest Oriole about the Carlsbad Cave when Mr. Bailey was there, and its loud rich song "was frequently heard

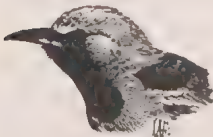
along the canyons during April, as the birds were inspecting their last year's nests in the tall yuccas, or catching insects from the yucca and cactus flowers. Later, when the century plants and lechuguillas should blossom, they would find both food and drink, for they gather the rich stores of nectar as well as the insects from these blossoms (1928a, pp. 152-55).

On the west slope of the San Andres Mountains, in the edge of the Jornada Valley, Mr. Ligon discovered that this beautiful and rather rare Oriole was fairly common. He found many nests, all of them swinging to the blades of the yucca, usually pretty high up.

When passing through their country near Camp Lowell, Mr. Henshaw found seven or eight of the striking birds at a water hole, where "they had evidently come from the adjoining desert to slake their thirst" (1875, p. 318).

ARIZONA HOODED ORIOLE: *Ícterus cucullátus nelsoni* Ridgway

DESCRIPTION.—*Male:* Length 6.5-8.5 inches, wing 3.3-3.6, tail 3.5-4.2. Bill attenuated, decurved; tail long, graduated. *Adult male:* Light, cadmium yellow except for black mask-like throat patch, fore part of back, wings, and tail, grayish tips of outer tail feathers, and white bars and edgings of wings. Bill, legs, and feet bluish. *Adult female:* Upperparts olive-green, washed with gray on back; wings brownish with two white bands and whitish edgings to quills; underparts pale yellow. *Young:* Like adult female but duller, upperparts suffused with brownish. *Immature males* (in second year): Like adult female but throat patch as in adult male.



From Handbook

FIG. 113. Arizona Hooded Oriole

COMPARISONS.—The female can be distinguished from other female New Mexico Orioles by the decurved bill and graduated tail (outermost feathers an inch shorter than central pair).

RANGE.—Breeds in the Lower Sonoran Zone of southern California, southern Arizona, southwestern New Mexico, and south to Tepic and Lower California; winters south of United States. Casually in central California.

STATE RECORDS.—The Arizona Hooded Oriole, the range of which extends from southern Arizona into southwestern New Mexico, has been recorded as far north as Silver City, April 13, 1905 (Hunn), where a specimen was taken April 3, 1915 (Kellogg). It breeds at Carlisle (Barrell); it was taken at 5,100 feet near Adobe Ranch July 28, 1908 (Goldman); [it is common in the Animas Mountains in summer (Ligon, 1916-1918)]; and a pair was seen at Mesilla, July 22, 1913 (Merrill).

Although it deserts the State for the winter, a bird was found as late as October 4, in 1893, in the Guadalupe Canyon in the extreme southwestern corner of the State (Mearns).—W. W. COOKE.

NEST.—Cup-shaped, semi-pensile or securely attached to twigs of various trees or leaves of fan palms; woven of fresh wiry grass, yucca or fan palm fibers, but also made of Spanish moss, lined with down, and sometimes wool, hair, or feathers. *Eggs:* Usually 3 to 4, white or whitish, irregularly spotted, blotched and scrawled in zigzag lines with dark brown.

FOOD.—Insects and larvae, including hairless caterpillars and small grasshoppers.

GENERAL HABITS.—In the towns of southern California the Arizona Hooded Oriole merits its name of Palm-leaf Oriole, as it hangs its shallow basket nest, woven of palm-leaf fibers, from the underside of the outstretched, protecting fan palms. In the country it frequents both low chaparral and groves of mesquite and cottonwood, and Doctor Grinnell has found one sipping nectar, in company with hummingbirds, in a profusely blossoming ironwood. Its song is a characteristic Oriole whistle, besides which it has a typical Oriole chatter. As Mr. Henshaw says, it shuns arid districts, being found in the fringes of deciduous trees along the streams. From the cottonwoods it flies to low bushes on the canyon sides, gleaning insects from the branches or even occasionally from the ground.

The Arizona Hooded supplies Frank F. Gander with a second interesting record of the "Swimming Ability of Fledgling Birds." Jumping from their nest in a eucalyptus tree, two little Orioles he had discovered fell twenty feet into a pond, but "at once swam ashore, paddling with their feet, and their wings spread out on the water" (1927, pp. 574-75).

ADDITIONAL LITERATURE.—BAILEY, F. M., Auk, XXVII, 33-35, 1910.

ORCHARD ORIOLE: *Ícterus spúrius* (Linnaeus).

DESCRIPTION.—*Male:* Length (skins) 5.8-6.5 inches, wing 2.9-3.2. *Female:* Length (skins) 6-6.3 inches, wing 2.7-3. *Adult male in spring and summer:* Black except for dark chestnut belly, epaulettes, and hinder part of back, and brown and whitish edgings of wings; bill with basal half bluish. *Adult male in fall and winter:* Like summer male but feathers of epaulettes, back, and sometimes head and neck edged with buffy gray, olive, or chestnut obscuring the black; those of chestnut underparts sometimes edged with yellowish. *Adult female in spring and summer:* Upperparts yellowish olive-green, becoming more yellowish on upper tail coverts and tail; wings with two whitish bands and whitish edgings, underparts dull yellow. *Young in juvenal plumage:* Like adult female but wing markings tinged with buff. *Male in second year:* Similar to adult female but lores and throat black.¹

RANGE.—Breeds from North Dakota, Minnesota, Michigan, southern Ontario, central New York, and New Hampshire south to northern Florida and the Gulf coast of southern Texas, Oaxaca, and Chiapas; winters from southern Mexico to northern Colombia; casual to New Brunswick, Colorado, etc.

STATE RECORDS.—The Orchard Oriole breeds west regularly to western Kansas and to the Davis Mountains of extreme western Texas. It thus comes nearly to New Mexico, but has not yet been found breeding in the State. A single bird taken by Doctor Henry many years ago, and labeled as taken from "Mimbres to Rio Grande," was probably taken at Fort Thorn.

Doctor Kennerly reports taking an Orchard Oriole when 75 miles west of Albuquerque with Lieutenant Whipple's party on one of the surveys for a Pacific railroad. But as he was there about the middle of November, long after the last Orioles should have left, unless he saw a belated bird of the year, it is probable that there was a mistake in the record.

[In the spring, on May 27, 1926, Ligon saw one 3 miles northwest of Hagerman in the cottonwoods of the Felix River.]—W. W. COOKE.

¹ Chapman, F. M., Handbook of Birds of Eastern North America, Plate XXI, 364.

NEST.—Basket-like, sometimes pensile, woven of wiry green grass, at times lined with cotton or thistle down. *Eggs*: 4 to 6, usually pale bluish white, sometimes faintly overlaid with grayish, marked most heavily around the larger end with blotches, scrawls, and tracings of browns and purples.

GENERAL HABITS.—On the Lower Rio Grande, in Texas, the social Orchard Oriole, which does not object to other species nesting in the same tree with it, is the bird most often imposed on by the Cowbird.

ADDITIONAL LITERATURE.—STONE, WITMER, Educational Leaflet 42, Nat. Assoc. Audubon Soc.

BULLOCK ORIOLE: *Icterus bullocki bullocki* (Swainson)

PLATE 70

DESCRIPTION.—Length: 7.5–8.6 inches, wing 3.8–4.1, tail 3.1–3.7. *Adult male in summer*: Line over eye, sides of head and neck, *posterior upperparts, and underparts, orange or yellow; crown, anterior upperparts, line through eye, and narrow throat patch, black*; tail with black tip, and middle feathers mainly black, changing to almost wholly yellow on outside feathers; *wings black, with conspicuous white patch and edgings*; bill black above, bluish below; legs and feet bluish. *Adult male in winter*: Like summer male but feathers of scapulars, back, and rump tipped with gray, and those of underparts edged with whitish. *Adult female*: Head and hind-neck yellowish olive, back, scapulars, and rump olive-grayish, back sometimes streaked with black, but brightening to wax-yellow or deeper on upper tail coverts and tail; *wings with one broad white band and edgings; throat usually with more or less black, underparts lemon-yellow fading to gray on belly*. *Young in juvenal plumage*: Similar to female but colors duller, throat without black, and yellow replaced by buffy and sometimes almost wanting.

RANGE.—Breeds in Lower Transition and Sonoran Zones from southern interior of British Columbia to southern Alberta and southern Saskatchewan south (as far east as central North Dakota, central Nebraska, and western Kansas) to southeastern Texas, Coahuila, northern Durango, Sonora, and northwestern Lower California; winters in Mexico from Durango south to Puebla, Michoacan, and Guerrero. Accidental in New York and Maine.

STATE RECORDS.—During the summer the Bullock Oriole is one of the fairly common residents of the lowest valleys, and in the lower foothills up to 6,500 feet throughout New Mexico. It breeds at Carlsbad (Dearborn), Mesilla (Merrill), Deming (Bailey), Silver City (Fisher), Socorro (Goldman). [Near Elephant Butte, May 24, 1916, four fresh eggs were found, and on the McKenzie Ranch, 60 miles north of Roswell, June 16–21, 1918, several pairs were found; it was noted nesting in the Pecos Valley between Roswell and Fort Sumner, June 16–21, 1918, and in Grant County, May 6–10, 1920 (Ligon)]; Carlisle (Barrell); Santa Rosa (Bailey); Rinconada (Surber); Santa Fe, 1918–1922 (Jensen); and Shiprock (Gilman); thus breeding from 3,500 to 6,500 feet.

After the breeding season, a few were seen along Red River, Colfax County, July 28–October 24, 1913, and a specimen was taken on August 4 (Kalmbach). In the fall the species ranges higher and has been noted, July 31, 1904, at Tres Piedras, 8,076 feet (Gaut); on August 14, 1904, in the Hondo Valley at 7,600 feet, and at a little below this altitude in the Santa Clara Canyon on August 31, 1906 (Bailey). Most of the birds leave the State in August and the remainder the following month. A late bird was noted October 2, 1913, at Mesilla (Merrill).



From Biological Survey

BULLOCK ORIOLE

His brilliant orange and black plumage shows handsomely as he moves about, singing, through the tree tops

On the return in the spring the first arrival was noted at Carlisle, April 14, 1890 (Barrell); Mesilla, April 26, 1903 (Ford); and April 20, 1912; State College, April 21, 1915 (Merrill); Silver City, April 30 (Hunn); [Albuquerque, May 3, 1920 (Ligon)]; Rinconada, May 4, 1904 (Surber); and Chloride, May 2, 1915 (Ligon)—W. W. COOKE.



MAP 57. BULLOCK ORIOLE

Shaded area shows general breeding range, mainly in Upper and Lower Sonoran Zones

NEST.—Pocket shaped, pensile, or supported on the sides, often in bunches of mistletoe, in cottonwoods, boxelders, poplars, scrub oaks, and mesquites; woven of horse hair, strings, or raw cotton, vegetable fibers, and inner bark, lined with grasses, horse hair, down, and wool. *Eggs:* 3 to 6, grayish or bluish white or pale buffy; marked with irregular hair lines, mainly around the larger end.

FOOD.—Largely insects that infest orchards and gardens. When fruit trees are in bloom, the Bullock Orioles are constantly busy among the blossoms and save many of them from destruction. Beetles make 35 per cent of their food, and nearly

all are harmful; many are weevils, some of which live upon acorns and other nuts. Ants and wasps amount to 15 per cent. Caterpillars, with a few moths and pupae, are the largest item of food and amount to over 41 per cent, and include codling moth larvae. Grasshoppers and alfalfa weevils are also eaten. The black olive scale was found in 45 of the 162 stomachs examined. The vegetable food is practically all fruit (19 per cent) and in cherry season consists largely of that fruit. Eating small fruits is the bird's worst trait, but it will do serious harm only when very numerous. In New Mexico, it was seen eating caterpillars that defoliate willows and wild plum trees (Cockerill).

GENERAL HABITS.—The brilliant orange and black Bullock Oriole, which frequents the tops of the tallest trees, arrives at Mesilla Park about the middle of April, Professor Merrill writes, the males appearing first. As he says, "they swing the nests in cottonwoods and mulberries in abundance and the young are flying by the first of July. They leave in October." While the young are in the nest, Professor Merrill has "watched the parents fly back and forth time and time again, bearing back each time an insect apiece, usually a grasshopper, as they were most numerous then. Searching among the trees as they do, they eat many other insects and larvae from hidden cocoons. The fruit eaten is negligible" (MS).

Although Mr. Ligon has found them in suitable places up to 6,500 feet, all over the State, they were found most commonly among cottonwoods along watercourses, especially on the Rio Grande and the Pecos. Naturally enough, the clear pipe of the richly colored Bullock, followed by his full sweet song, becomes one of the pleasant memories of the field worker who, having crossed the arid plains, has reached the grateful shade and verdure of the cottonwood bottoms.

BREWER BLACKBIRD: *Euphagus cyanocephalus cyanocephalus* (Wagler)

DESCRIPTION.—Length: 8.7–10.2 inches, wing 4.6–5.2, tail 3.8–4.5. *Adult male:* Black, head and neck glossed with violet, the rest of the plumage with bluish green (more highly glossed in winter); iris pale yellow or yellowish white. *Adult female:* Head, neck, and underparts dark brownish gray, faintly glossed with violet on head and neck, and green on underparts; upperparts darker, wings and tail more glossed with bluish green (paler anteriorly in winter). *Young:* Like winter females, but feathers with different texture and without gloss. *Immature male in first winter:* Like adult male, but feathers largely tipped with grayish brown.

RANGE.—Breeds mainly in Transition Zone from southern British Columbia, central Alberta, and central Manitoba south to central Texas, southern New Mexico, Arizona, and northern Lower California; winters from southern British Columbia, southern Manitoba, Kansas, southern Colorado (a few) and western South Carolina south to Guatemala and southern Mexico. In migration east to Iowa and, casually, Illinois. Recorded from Hudson Bay and Wisconsin (nest).

STATE RECORDS.—As a summer resident in New Mexico, the Brewer Blackbird occurs only locally. It was reported as breeding at Las Vegas, 6,500 feet (Mitchell); Halls Peak, 8,000 feet (Barber); near Beaver Lake, 7,000 feet (Ligon); and Mesilla, 3,800 feet (Merrill); common and presumably breeding at Wingate, 7,000 feet, June 18–29, 1905 (Hollister); [two apparently nesting on the Rio Pueblo, Taos County,

at 7,800 feet (Ligon, 1919)]; two probably breeding near Mayhill, 7,200 feet, June 19, 1913. It is most common as a breeder in the lake region of Rio Arriba County, and in this district, in 1913, was common, both old and young being seen. It was noted July 20, on the Chama River near El Vado; July 27, at Boulder Lake, 7,200 feet; and August 1, at Dulce Lake, 6,700 feet (Ligon). [At Lake Burford a pair nested in 1918 (Wetmore). In Colfax County considerable numbers were seen, June 18, 1924, in Moreno Valley, near Elizabethtown, where they were carrying food to their young (Ligon). In northern Santa Fe County, a few pairs nest occasionally along the rivers, and nests were found on June 3 and 19, 1919 (Jensen). In the Black Range, 80 miles southwest of Magdalena and north in the high timbered mountains, it nests from May 1 to 10 (Ligon, 1916-1918).]

Early in the fall it begins to arrive in flocks from the more northern breeding grounds. It is most common from 6,500 to 8,000 feet, and occasionally is found still higher, as at 8,500 feet on August 25, 1904, at Costilla, and between Brazos Canyon and Tierra Amarilla, September 11, 1904 (Bailey). Near Koehler Junction, it was fairly common in migratory flocks, being noted on August 20, September 2, 25, 28, 29, and October 3 and 7 (Kalmbach); abundant about Clayton, October 22, 1893 (Seton). [Two hundred were seen at Zuni on October 2, and eight on October 4, 1916 (Skinner). In 1920 a large flock spent several days near the Santa Fe Indian School (Jensen).] In the northern part of New Mexico it lingers until late in the fall—Farmington, still abundant November 22, 1908 (Birdseye); and Aztec, common December 3 to 9, 1893 (Loring).

It remains throughout the winter in the Rio Grande Valley, from Albuquerque southward. Some winter at Chloride (Ligon), and in the lower mountains to at least 6,000 feet at Silver City (Marsh). On the Carlsbad Bird Reserve it was common in January, 1915, and was noted during the winter of 1915-16, [it was common in December, 1916, and on the Rio Grande Bird Reserve (Elephant Butte), was noted on December 8, 1916 (Willett). At Engle a flock was seen December 3, 1918 (Ligon).]

In the spring 200 were seen, April 26, 1915, at Mayberry Lake (Ligon); in 1895, the first migrants appeared on April 28 at Halls Peak (Barber); and in 1900 at Willis, April 24 (Birtwell); while in 1892, late migrants remained along the Mexican boundary until May 6 (Mearns), and in 1884 at Silver City until May 15 (Marsh).—W. W. COOKE.

NEST.—In small colonies, usually in trees or bushes, but also in tussocks of grass on the ground; a loose platform of twigs, supporting a cup of rootlets, fine twigs, and grass, and sometimes string or wire, cemented with mud, and heavily lined with hair or, rarely, with feathers. **Eggs:** Usually 4 to 6, grayish, greenish, or pale bluish white, variably marked but usually profusely spotted, blotched, and streaked in wavering lines with browns and lavenders.

FOOD.—Caterpillars and pupae form the largest item of animal food (about 12 per cent). Many of these are cutworms, and there are also cotton bollworms, corn-ear worms, and codling moth pupae. Beetles constitute over 11 per cent of the food. Grasshoppers are eaten late in the season. The vegetable food is practically all grain, fruit, and weed seeds. Grain, mostly oats, amounts to 54 per cent; fruit, largely cherries, 4 per cent, and weed seeds not quite 9 per cent. The grain is probably mostly wild, volunteer, or waste, so that except locally, where large flocks pass through when the crops are in condition to be injured, the bird does most damage by eating fruit. In alfalfa regions it is one of the most effective enemies of the alfalfa weevil, which constitutes about a fifth of the food of both young and adults in May, June, and July (Kalmbach). It prefers insects to fruit, leaving cherries for insects when plowing begins in neighboring fields (Beal).

GENERAL HABITS.—In San Juan County, in the fall migration of 1908, Mr. Birdseye found the yellow-eyed, glossy-coated Brewer Blackbirds exceedingly abundant at Farmington and Fruitland. At Liberty and Shiprock they were also common. He says, "They go in immense flocks, which can sometimes be heard for almost a mile. At Farmington they settle in the streets in large numbers and are as tame as English Sparrows in New York City" (MS). The presence of these handsome birds, as familiars of the lawns, aside from their densely peopled roosting trees, resorted to at sunset, left at dawn, adds an element of peculiar interest to many western towns and cities.

At Mesilla Park the Brewer is resident, but nests in smaller numbers than the other blackbirds. In fall and spring, Professor Merrill states, its numbers are greatest. It nested in 1913 in the outskirts of a large Yellow-head colony near Mesilla Park. At other seasons of the year it usually associates with the Red-wings and Yellow-heads, and has the same feeding habits (MS).

Where trees were scarce, Mr. Ridgway found a colony of over a hundred pairs.

The Brewer is noted for following the plow to pick up grubs and worms. As J. G. Tyler says, "If the workman walks along without appearing to notice their presence, these birds will often follow at a distance of not over 2 or 3 feet" (1913, p. 74). At Clovis, California, where the vineyards were invaded by a scourge of beetles, a great flock came every day until they had nearly freed the vines of them. During a flight of grasshoppers in Utah, Mr. Ridgway says, they seemed to eat nothing else.

GREAT-TAILED GRACKLE: *Megaquiscalus major macrourus* (Swainson)

DESCRIPTION.—*Male:* Length, 17–18.7 inches, wing, 7.3–8, tail, 8.3–9.3, graduated from 2.5–3.5 inches; bill, 1.5–1.7. *Female:* Length about 11.5–13.5 inches, wing, 5.7–6.5, tail, 5.4–6.3, bill, 1.2–1.4. *Adult male:* Head, neck, and breast purple, changing through steel-blue to greenish on back and belly; wings and tail black, glossed with bluish green, lesser wing coverts steel-blue. *Adult female:* Upperparts dusky brown, head dark brown, darkening on back to blackish, glossed with green and purple; underparts hair brown, chin and throat paler. *Young:* Like adult female but browner, without gloss above, and more buffy below.

RANGE.—Southern New Mexico and central Texas south through southern Mexico, Yucatan, and Central America to northern Colombia, and west over southern part of Mexican tableland to Michoacan and Jalisco.

STATE RECORDS.—The first records of the Great-tailed Grackle in New Mexico were obtained in 1913, and Professor Merrill writes in regard to them: "A male of this species was shot near Las Cruces, May 15, 1913, and brought to me by Miss Fannie Ford. The skin is in the College Museum. At La Mesa a friend of Miss Ford reported a pair to be nesting in an old apricot tree in the dooryard. The description of the birds and their nest, song, and actions leave little doubt as to their identity. These are the only records here. La Mesa is across the Rio Grande and a little below Mesquite," about 15 miles below Mesilla (MS). [An adult male

was taken May 24, 1920, on the Mimbres, 30 miles southeast of Silver City (Kellogg). A molting female was taken, July 21, 1924, in the Pecos Valley, 35 miles south of Carlsbad; and a breeding colony was found, July 24, 1925, 8 miles south of Carlsbad, (Ligon).]—W. W. COOKE.

NEST.—Bulky, made largely of dried grass and Spanish moss, usually with an inside coating of mud; built in low trees or bushes, often in swampy places, sometimes in towns. *Eggs*: 3 to 5, pale bluish or greenish, drab, olive, or purplish gray, grotesquely marked with brown and black lines.

GENERAL HABITS.—The large, Great-tailed Grackles, known as Jackdaws or Fantailed Grackles, have strikingly long, keeled, and graduated tails, and are noisy, dominant characters, with interesting habits.

The breeding colony that Mr. Ligon found near Carlsbad, while not in town, was in a marshy draw near the parallel bridges of an automobile road and a railroad. A perilous as well as noisy nesting ground, it might seem, but the cat-tails that filled the draw afforded protecting cover. Great numbers of Red-winged Blackbirds were sitting around when the Great-tails came with food for their young (1926a, pp. 93-94).

Although rare in New Mexico, in Brownsville, Texas, A. P. Smith says, the Jackdaws are found "in possession of the streets, competing with the somewhat awed, and as yet not numerous, English Sparrow, as scavengers of the roadway" (1910, p. 97). At San Antonio they even nest along the streets.

In Brownsville, where Dr. Charles W. Townsend had an excellent opportunity to watch this bird, he was struck with "the great variety of its clear and at times musical notes and songs, mixed with others that were not so pleasing." In courtship, "the males fought, or rather pretended to fight, with tails cocked up and wings partly spread, facing each other, and sometimes flying up at each other like fighting cocks." The Great-tails also pose and execute "a form of dance." The head and neck are stretched up nearly vertically, a position that gives them an absurdly attenuated look, and when several males pose motionless facing each other in this attitude, the effect is extraordinary. (1927, pp. 553-54).

COWBIRD: *Molóthrus áter áter* (Boddaert)

DESCRIPTION.—Length: Male about 7.7-8.2 inches, wing 4-4.6, tail, 2.9-3.3, bill .6-.7, tarsus 1.1 (female considerably smaller). Bill short, broad and high at base, *conspicuously arched above*. *Adult male*: Head, neck, and chest brown; rest of plumage glossy greenish-black. *Adult female*: Upperparts brownish gray, faintly glossed with greenish, the feathers with darker centers and blackish shaft streaks, especially on back; wings and tail dusky, with paler edgings, these nearly white on longer primaries; underparts paler, decidedly so on chin and throat, lower underparts usually more or less distinctly streaked. *Young*: Similar to adult female but duller,

feathers of upperparts bordered with gray and underparts conspicuously streaked with brown and buffy or whitish.

RANGE.—Eastern North America, breeding from Ontario, Quebec, and New Brunswick south to Atlantic Coast, Virginia, Louisiana, central Texas, and New Mexico; winters from Michigan and Massachusetts south to Florida, Alabama, and Michoacan.

STATE RECORDS.—The Cowbird is a fairly common breeder over much of the lower parts of New Mexico, except the southwestern corner. It was first recorded on July 27, 1820, on Major Long's Expedition to the Rocky Mountains, while near the head of the Mora River, when one was said to have followed the party for 5 or 6 hours (in James, 1823, vol. II, p. 80). It breeds certainly at Shiprock (Gilman), Gallup (Fisher), Taos (Bailey), Espanola (Surber), Albuquerque (Ligon), Ribera (Bailey), Los Pinos (Coues), Santa Rosa and Carlsbad (Bailey), Carlisle (Barrell), Silver City and Chloride (Ligon), and Fort Thorn (Henry). [At Lake Burford, 4 were seen May 23–June 19, 1928 (Wetmore). It is common in northern Santa Fe County (Jensen, 1922).] These places vary in altitude from 4,600 feet at Santa Rosa to 7,000 feet at Taos. As a breeder it has been found from 3,500 to 6,500 feet and probably is not common much above 6,500 feet.

In the fall, when it spreads widely over the country, it still remains usually below 7,000 feet, though a single bird was taken May 11, 1900, at Willis, 7,800 feet (Birtwell), and one was seen on August 14, 1904, near the Hondo Canyon, 8,100 feet (Bailey). Near Koehler Junction, July 28 to October 24, 1913, a few were seen about almost every herd of cattle, and a flock of 100 to 200 was seen on September 6 (Kalmbach). During migration the species must pass through the southern half of the State to its winter home in Mexico. The larger part of this migration occurs in September, but a few remain much longer, even to October 30 in 1908, at Fruitland (Birdseye).

All leave the State for the winter, and in the spring return late in April. A bird of this form was taken, April 28, 1913, on the Gila, near the Arizona boundary (Brooks).—W. W. COOKE.

EGGS.—Deposited, usually singly, in nests of other birds, 8 to 12, whitish, whole surface covered with brown specks and blotches, usually heaviest about the larger end.

FOOD.—Grain, 16 per cent, half of which is probably waste, 20 per cent insects, which are either harmful or annoying, among them the alfalfa weevil, which is eaten largely in its season. In Colfax County, July 28 to October 24, grasshoppers made 94 per cent (Kalmbach). More than 50 per cent seeds of noxious weeds whose destruction is a positive benefit to the farmer.

GENERAL HABITS.—The brown-headed, glossy-bodied Cowbirds, of whatever subspecies, associate not only with cows but horses walking close by their heads to pick up the insects disturbed by them as they move slowly about cropping grass. So familiar do the birds become that they often perch on the backs of their animal friends.

Near Santa Rosa, where they came about our camp, their whistles were heard a great deal, at a little distance being surprisingly suggestive of the call of the Goldfinch. Whatever the historic causes, the present domestic habits of the Cowbirds are abnormal, making them pariahs of the bird world. Not only are they polygamous and polyandrous, but they shirk the duties of parentage, depositing their

eggs in the nests of ninety odd kinds of smaller birds, their large young crowding the rightful nestlings from their nests and making the enforced foster parents endless trouble in caring for them. They have been found by Mr. Jensen putting their eggs in the nests of House Finches,



MAP 58. COWBIRDS

1. Cowbird. 2. Dwarf Cowbird.

Shaded area shows general range. Triangles mark summer records

Western Chipping Sparrows, and Brewer Sparrows; and by Mr. Ligon, in wooded canyons at about 6,500 feet, in the nests of Plumbeous Vireos. At Chloride he saw two males and a female locate a Vireo's nest, after which one of the males picked up two of the three Vireo's eggs and dropped them to the rocks ten feet below, apparently to make room for the intruders.

Although it leads to no family life, the formal courtship of the Cowbird is not without interest. The song and accompanying display

of the male Cowbird, as witnessed at Lake Burford, is graphically described by Doctor Wetmore. "The bird would rest quietly for a few seconds, then expand the tail and draw the tip slightly forward, erect the feathers of the back and to a less extent those of breast and abdomen, and then sing *bub-ko-lum-tsee*. In giving the first three notes he rose twice to the full extent of his legs and sank back quickly . . . While watching [him] I heard a low call like *tsee tsee*, to which [he] responded. At once a second male came flying in, and, suddenly checking when two or three feet from the bush, extended the bill straight up and in this attitude came down slowly to a perch three feet from the first bird. This one at once assumed the same attitude and the two remained thus for two or three minutes with bills pointing straight in the air, twisting their heads around but seeming never to look directly at one another. Finally first one and then the other lowered his bill and glanced at his neighbor but immediately stiffened up again in the erect attitude. The newcomer gradually relaxed, finally sinking down and fluffing out his feathers, to remain almost asleep. The original male then began to sing, opening his wings wide and then closing them again in addition to his other motions and at times nearly overbalancing in the violence of his display." (1920a, p. 402).

At Mesilla Park, in spring, Professor Merrill found, the Cowbirds return in small flocks about the first of March and "stay around wherever there are cattle, either on the plains or in the valley, feeding on insects, grass and weed seeds, and grain at the troughs or in droppings. For this reason they are beneficial, but one would rather see them devote a part of their time to the more natural function of raising their families themselves. In the latter part of July they begin to form in larger flocks, their little foundlings, then grown, joining them until the numbers reach into the hundreds" (MS). While going about in these large fall flocks, Mr. Ligon reports, they do "great damage to the heads and grain of forage crops" (MS).

[SAGEBRUSH COWBIRD: *Molóthrus áter artemísiae* Grinnell

DESCRIPTION.—Wing: Male, 4.5 inches. Like *ater* but larger, with longer and relatively more slender bill, vertically shallow at base and laterally compressed, the upper outline *straight* or even slightly depressed. The male is indistinguishable in color from *ater* but the female is paler, being *drab* instead of slaty hair-brown, with much *paler* clay-color on the throat.

RANGE.—Breeds from southern British Columbia (mainly east of Cascades), southern Mackenzie and southern Manitoba south to North Dakota, Wyoming, central Utah, Nevada, and California (east of Sierra Nevada); winters south to southern Texas, Vera Cruz, Michoacan, Tepic, and southern Lower California.

STATE RECORDS.—The Sagebrush Cowbird undoubtedly crosses New Mexico in migration, but apparently there are no specimens as yet recorded from the State.]

DWARF COWBIRD: *Molóthrus áter obscurus* (Gmelin)

DESCRIPTION.—Similar to the Sagebrush Cowbird but smaller. *Male*: Length (skins), 6–7.1 inches, wing 3.8–4.1. *Female*: Length (skins), 5.6–6.3 inches, wing 3.4–3.7.

RANGE.—Resident of the Southwestern United States and Mexico, from southeastern California, southern Arizona, southwestern New Mexico, southern Texas, and southern Louisiana south to Vera Cruz, Oaxaca, Colima, and northeastern Lower California.

STATE RECORDS.—The small southern form of the Cowbird is about as common in Grant and Hidalgo Counties in southwestern New Mexico as its larger relative is elsewhere in the State. It leaves the State for the winter, but remains in the fall until November (Henry), and even once in 1854 until December 6, on the Gila River (specimen in U. S. National Museum). In the spring, the arrival of the first was noted at Carlisle April 26, 1890 (Barrell).—W. W. COOKE.

EGGS.—Deposited in nests of other birds.

GENERAL HABITS.—In the Colorado Valley, Doctor Grinnell found flocks of about a hundred Dwarf Cowbirds staying about a town, "either roosting quietly in mesquites among the adobe ruins, or flying about in compact unanimously acting flocks, or feeding in company with other Blackbirds in cattle pens. In one case a bunch of fully 40 were feeding close together on the ground in a calf corral, all with uptilted tails and quivering bodies, a mannerism peculiar to the species" (1914, p. 156). On the Colorado Desert, in summer, Doctor Grinnell found them "keeping in the near vicinity of water" (1915, p. 101).

Their eggs have been reported by Herbert Friedmann as found in the nests of the Mexican Ground Dove, certain Orioles, the Gray-tailed Cardinal, Long-tailed Chat, Verdin, Black-throated Sparrow, Small White-eyed Vireo, and Curve-billed Thrasher (1925, pp. 548–549). To this list, Wilson C. Hanna, from an examination of nests victimized, adds the Traill Flycatcher, Willow Goldfinch, San Diego Song Sparrow, San Diego Towhee, Blue Grosbeak, Lazuli Bunting, two Vireos, a Yellow Warbler, the Golden Pileolated Warbler, and the Western and Plumbeous Gnatcatchers.

ADDITIONAL LITERATURE.—ALLEN, G. M., *Birds and Their Attributes*, pls. facing pp. 204 and 206, pp. 235–236.

TANAGERS: Family Thraupidae

The four representatives of the tropical Tanager family, which come north into the United States for the summer, keep the characters that adapted them to their southern arboreal life and their habit of wandering through the forests feeding on flowers, fruits, and insects—brilliantly colored plumage with great sexual and seasonal differences, together with a long heavy conoidal bill with tip slightly notched and cutting edge of upper mandible more or less distinctly toothed or lobed

near the middle. The bill characters correlated with nine primaries and a scaled tarsus are distinctive of the North American representatives of the family. Rictal bristles are well developed, the wings are long and pointed, and the tail moderate and emarginate. As the Tanagers are fruit and insect eaters, they are migratory in the United States. They inhabit woodland, nest in trees, and are no great songsters (Coues).

LOUISIANA OR WESTERN Tanager: *Piranga ludoviciana* (Wilson)

PLATE 71

DESCRIPTION.—*Male*: Length (skins) 6.2-6.9 inches, wing 3.7-3.8, tail 2.6-3, bill .6, tarsus .7-.8. *Female*: Length (skins) 6.3-6.9 inches, wing 3.5-3.8, tail 2.7-2.8, bill .6, tarsus .7-.8. *Adult male in summer*: Foreparts of head and neck red (varying from orange-yellow to crimson on head and usually paler on throat), hind-neck, posterior upperparts and underparts light yellow; back, wings, and tail, black; wing coverts with broad yellow patches and narrow yellow or whitish bar, tertials (and sometimes tail feathers) tipped with white; under wing coverts yellow; iris brown, bill dull waxy yellowish, legs and feet bluish gray. *Adult male in winter*: Similar to summer male but head yellow (or but slightly tinged with red), color obscured on back of head and hind-neck with olive-green or dusky feather tips; back usually with yellowish feather margins; wings and tail with white or yellow margins. *Adult female in summer*: Forehead sometimes tinged with red; upperparts olive-green, back and scapulars usually grayish, rump and upper tail coverts yellowish; wings and tail grayish brown with olive-green edgings, wings with two distinct yellowish or one yellow and one white band; underparts mainly dull yellowish, under tail coverts light yellow. *Young in juvenal plumage*: Dusky yellowish or brownish green, yellower below and obscurely streaked; wings and tail brown with two yellowish bars.

COMPARISONS.—The two yellowish—or one yellow and one white—wing bars are diagnostic of the Western Tanager in any plumage.

RANGE.—Breeds in Canadian and Transition Zones from southeastern Alaska, southwestern Mackenzie, and southwestern South Dakota south to high mountains of central-western Texas, southern New Mexico, southern Arizona, and Lower California (found in spring and summer); winters at Brownsville, Texas (rarely), and south from central Mexico through highlands to Guatemala; casual in migration in Wisconsin, New York, New England, and Louisiana.

STATE RECORDS.—The mountains of both northern and southern New Mexico are inhabited during the summer by the Western Tanager. In the north, in the Sangre de Cristo Mountains, a specimen was taken, July 5, 1903, at Canoncita, 7,000 feet, and a pair was seen about July 7, at Glorieta, 7,500 feet (Bailey); on July 16, 1903, parents were still feeding young at 8,000 feet on the Pecos near Willis; the species was also seen July 19, at 8,700 feet, and a single bird on July 25, at 10,200 feet, in the Upper Pecos mountains. It breeds in the Hondo region near Twinning, where, at about 10,000 feet, on August 4, 1904, a bob-tailed young was found with its parents (Bailey). [It is fairly common and well distributed over the Sangre de Cristo Range as high as 10,000 feet. On June 22, 1919, a pair was noted on the Little Rio Grande at about 7,400 feet, evidently near the nest; on June 24, several were seen 20 miles southeast of Taos at 10,000 feet. It was heard singing commonly about Cowles, July 10-18, from 8,000 to 10,000 feet (Ligon). In the Santa Fe region it is common in the mountains from 7,500 to 10,000 feet (Jensen).] In the western



LOUISIANA TANAGER
MALE FEMALE

COOPER TANAGER
ARIZONA HERMIT TANAGER
MALE FEMALE

near the middle. The bill characters correlated with nine primaries and a scaled tarsus are distinctive of the North American representatives of the family. Rictal bristles are well developed, the wings are long and pointed, and the tail moderate and emarginate. As the Tanagers are fruit and insect eaters, they are migratory in the United States. They inhabit woodland, nest in trees, and are no great songsters (Coues).

LOUISIANA OR WESTERN Tanager: *Piranga ludoviciana* (Wilson)

PLATE 71

DESCRIPTION.—*Male*: Length (skins) 6.2–6.9 inches, wing 3.7–3.8, tail 2.6–3, bill .6, tarsus .7–.8. *Female*: Length (skins) 6.3–6.9 inches, wing 3.5–3.8, tail 2.7–2.8, bill .6, tarsus .7–.8. *Adult male in summer*: Foreparts of head and neck red (varying from orange-yellow to crimson on head and usually paler on throat), hind-neck, posterior upperparts and underparts light yellow; back, wings, and tail, black; wing coverts with broad yellow patches and narrow yellow or whitish bar, tertials (and sometimes tail feathers) tipped with white; under wing coverts yellow; iris brown, bill dull waxy yellowish, legs and feet bluish gray. *Adult male in winter*: Similar to summer male but head yellow (or but slightly tinged with red), color obscured on back of head and hind-neck with olive-green or dusky feather tips; back usually with yellowish feather margins; wings and tail with white or yellow bars. *Adult female in summer*: Forehead sometimes tinged with red; upperparts olive-green, back and scapulars usually grayish, rump and upper tail coverts yellowish; wings and tail grayish brown with olive-green edgings, wings with two distinct yellowish or one yellow and one white band; underparts mainly dull yellowish, under tail coverts light yellow. *Young in juvenal plumage*: Dusky yellowish or brownish green, yellower below and obscurely streaked; wings and tail brown with two yellowish bars.

COMPARISONS.—The two yellowish—or one yellow and one white—wing bars are diagnostic of the Western Tanager in any plumage.

RANGE.—Breeds in Canadian and Transition Zones from southeastern Alaska, southwestern Mackenzie, and southwestern South Dakota south to high mountains of central-western Texas, southern New Mexico, southern Arizona, and Lower California (found in spring and summer); winters at Brownsville, Texas (rarely), and south from central Mexico through highlands to Guatemala; casual in migration in Wisconsin, New York, New England, and Louisiana.

STATE RECORDS.—The mountains of both northern and southern New Mexico are inhabited during the summer by the Western Tanager. In the north, in the Sangre de Cristo Mountains, a specimen was taken, July 5, 1903, at Canoncita, 7,000 feet, and a pair was seen about July 7, at Glorieta, 7,500 feet (Bailey); on July 16, 1903, parents were still feeding young at 8,000 feet on the Pecos near Willis; the species was also seen July 19, at 8,700 feet, and a single bird on July 25, at 10,200 feet, in the Upper Pecos mountains. It breeds in the Hondo region near Twinning, where, at about 10,000 feet, on August 4, 1904, a bob-tailed young was found with its parents (Bailey). [It is fairly common and well distributed over the Sangre de Cristo Range as high as 10,000 feet. On June 22, 1919, a pair was noted on the Little Rio Grande at about 7,400 feet, evidently near the nest; on June 24, several were seen 20 miles southeast of Taos at 10,000 feet. It was heard singing commonly about Cowles, July 10–18, from 8,000 to 10,000 feet (Ligon). In the Santa Fe region it is common in the mountains from 7,500 to 10,000 feet (Jensen).] In the western



	LOUISIANA TANAGER	
MALE		FEMALE
	COOPER TANAGER	
	ARIZONA HEPATIC TANAGER	
MALE		FEMALE

part of the State it breeds in the Zuni Mountains, where at 8,800 to 9,000 feet on Mount Sedgwick it was fairly common, June 23 and June 24, 1909 (Goldman); [at Lake Burford, 7,700 feet, May 23 to June 19, 1918, it was fairly common (Wetmore).] In the south, in the Capitan Mountains, it was noted as common in the yellow pine belt, June 8-19, 1899 (Bailey); and was found abundant during the summer of 1903, most common in the yellow pines at about 8,500 feet. Young about two weeks out of the nest were still being fed by the parents on July 10 (Gaut). [Young were seen 40 miles northwest of Grant, June 28, 1916. In the Black Range in Sierra County, on June 28, 1920, three nests were found in Black Canyon from 7,500 to 7,800 feet, in Douglas firs. It is rather common at Chloride in May and June, generally from about 7,500 to 8,000 feet (Ligon, 1916-1918).]

They are known to be early migrants, having been found far south of the breeding grounds by the third week in July and probably somewhat earlier. [Observed in great numbers, June 21, 1924, about 9 miles southeast of Taos, on the Taos-Cimarron Highway (Ligon).] They were recorded at Cloudcroft on July 18, 1901 (Fuentes), and on July 23, 1909 (Green); the first fall migrants were noted at Apache July 26, 1886 (Anthony); Animas Peak, 8,000 feet, August 3, 1908 (Goldman); and Carlsbad, August 13, 1910 (Dearborn). The latter part of August and early September mark the height of fall migration, and by the end of September the species has deserted the State. The last one noted at Willis, in 1883, was on September 26 (Henshaw); at Cooney, September 15, 1889 (Barrell); at Ancho, in the Jicarilla Mountains, September 23-24, 1903 (Gaut); Coyote Creek, near Black Lake, at 8,000 feet, September 8, 1903 (Bailey); and Apache, September 26 (Anthony).

On the return in the spring it is probable that a few enter the State the latter half of April. One was noted at Fort Wingate, May 1, 1887 (Shufeldt); the first was noted at Carlisle May 3, 1889 (Barrell), and at Rinconada May 3, 1904 (Surber). [They were observed in the Carson Forest, west of Tres Piedras, May 4, 1916, and were rather common in the Animas Mountains, May 7 and 8, 1920 (Ligon).] A specimen was taken at Silver City, May 15, 1912 (Kellogg). They were noted on the Upper Gila in May, 1914 (Rockhill). One was taken, apparently migrating, at Fort Wingate May 20, 1869 (Dr. E. Palmer); and others were seen at Silver City May 17, 1884 (Marsh).—W. W. COOKE.

NEST.—Usually on a horizontal branch of oak or conifer, 5 to 30 feet from the ground; made sometimes with a framework of forked twigs, and a few rootlets, moss, and coarse grasses, lined with fine rootlets and horsehair. *Eggs*: 3 or 4, pale bluish green, lightly spotted with browns and purples.

FOOD.—From April to September (in California), 82 per cent was insects and about 18 per cent fruit. "When it assembles in large numbers in the fruit districts [in the spring migration] it is the cause of heavy loss to small fruit growers. Under ordinary circumstances, however, the greater part of its food consists of insects, many of them harmful. Two very harmful families of beetles, whose larvae are wood borers and do much damage to trees and other plants, are represented in the food. The planting of berry-bearing trees near the orchard would no doubt prevent much of the loss occasioned" (Henshaw). As the small wild cherry is preferred to the large cultivated one, it would be a good tree to plant, as would elderberry and cascara, as they are also eaten.

GENERAL HABITS.—The Western, Louisiana, or Crimson-headed Tanager, with his sharply contrasted red, black, and yellow plumage, is a conspicuous bird when seen in clearings or, in migration, on a roadside fence where, perhaps, he is looking eagerly for passing insects

and flying out and back in plain sight, securing them almost in the manner of a Flycatcher. But in the forested mountains where he nests, a golden flash from a tree top may be all that is disclosed. Then, as Mr. Henshaw says, he is "busy the whole time gleaning from among the pines and spruces the larger beetles and insects which infest them, and generally keeps well up among the higher branches" (1875, p. 236). He might easily pass unnoticed were it not for his characteristic call and song. On the Pecos, near Willis, where a pair were feeding young, the *Pit-ick* of the father was given continually as he hunted slowly and quietly over the cottonwood branches or sat on a limb resting himself; and his longer *pit-er-ick*, *pit-er-ick* was also frequently heard, sometimes given softly, its notes run together.

In the Burro Mountains, in September, 1908, Major Goldman found one of the Tanagers feeding on wild cherries in a northeast slope canyon at 6,500 feet. In the Zuni Mountains, on Mount Sedgwick, he also saw several the middle of June, 1909, among quaking aspens, Douglas spruces, and limber pine (*Pinus flexilis*), at 8,800 to 9,000 feet (MS). In the Santa Fe region twelve nests located by Mr. Jensen were in Douglas fir.

ARIZONA HEPATIC TANAGER: *Piranga hepática oreophasma* Oberholser

PLATE 71

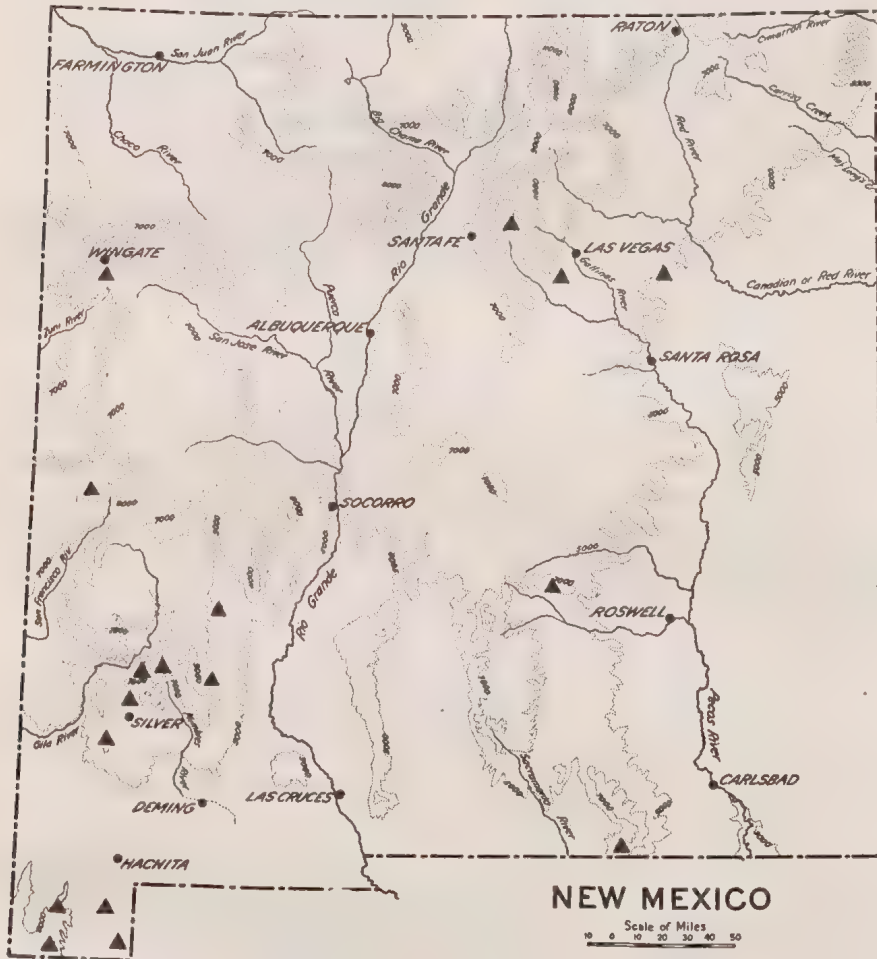
DESCRIPTION.—*Male*: Length (skins) 6.9–7.8 inches; wing 4–4.1, tail 3.1–3.4, bill .6–.7, tarsus .8–.9. *Female*: Length (skins) 6.9–7.7 inches, wing 3.8–4, tail 2.9–3.3, bill .6–.7, tarsus .8–.9. *Adult male in summer*: Upperparts dull red, brighter on crown, wings, and rump, tinged with brown on back and scapulars; tail and wings brownish with red edgings; cheeks grayish, streaked with white; underparts bright red, reddish gray on flanks, under mandible bluish gray. *Adult male in fall and winter*: Back and scapulars browner, underparts duller, feathers partly tipped with paler. *Adult female in summer*: Top of head yellowish olive-green, back, scapulars, rump, and upper tail coverts dull olive-gray, tail coverts tinged with olive-yellow; tail grayish olive with yellowish green edgings; wings with yellowish edgings; cheeks grayish; underparts yellow, sides tinged with grayish olive. *Adult female in fall and winter*: Similar to the summer female but plumage softer and coloration brighter. *Young in juvenal plumage*: Streaked, over olivaceous above and paler below. In the first breeding dress, some young males, at least, resemble the female, but with red feathers on the head and throat (Chapman).

COMPARISONS.—The gray cheeks and grayish back distinguish the Hepatic from the Cooper Tanager. (See p. 668.)

RANGE.—Breeds from northwestern Arizona, central New Mexico, and central-western Texas south over the tablelands of Mexico to Guatemala.

STATE RECORDS.—Although a southern species, reaching the northeasternmost part of its range in New Mexico, the Hepatic Tanager breeds principally in the mountains north to Mesa Yegua, 7,400 feet, June 25, 1903; Bernal, 7,000 feet, July 3–11, 1903 (Bailey); and Willis, 7,800 feet, July 5–12, 1883 (Henshaw); but it was taken as low as 4,800 feet, May 31, 1892, at Dog Springs (Mearns). It has been recorded from the Zuni Mountains, August 31, 1851 (Woodhouse), and Los Pinos, June 20–22, 1864 (Coues), but it is probable that the Los Pinos birds had dropped

down for a day from the Sandia Mountains, and possible that the Zuni Mountain birds were not breeding, but were merely visitors in fall migration. The species can not be common in these mountains, for it has not been seen by any of the various parties of the Biological Survey that have made extensive collections throughout the range. The nearest place to the south of the Zuni Mountains where it is known to breed is near the head of the Mimbres, 6,500 feet (Bailey); [Chloride Canyon,



MAP 59. ARIZONA HEPATIC TANAGER

Triangles mark breeding and breeding season records, mainly in Transition Zone

June 13, 1916, at 6,200 feet (Ligon)]; at Silver City, 6,000 feet, June 27, 1894 (Fisher); and in the Animas Mountains, 8,000 feet, August 3, 1908 (Goldman). It breeds east to the Guadalupe Mountains, where it was still feeding bob-tailed young on August 10, 1901, at 6,700 feet (Bailey); and to the Capitan Mountains, where the male of a pair was secured on July 22, 1903, at 9,000 feet (Gaut).

Early in the fall it leaves the State, some late records being September 14, at Apache (Anthony), and September 16, 1908, in the Burro Mountains, 6,500 feet (Goldman); during migration it occurs as low as 4,000 feet at Fort Thorn (Henry).

In the spring migration, it was taken on May 19, 1892, at the Hachita Grande Mountain (Mearns), and May 10, 1914, at Silver City (Kellogg). [It is most common in spring in the bottoms (bosques) of the Rio Grande (Ligon, 1916-1918).]—W. W. COOKE.

NEST.—Largely on low oak branches, a slight structure made of coarse rootlets and dried plant stems, lined with finer materials. *Eggs*: 3 or 4, pale bluish green, lightly spotted, chiefly around larger end, with browns and purples.

GENERAL HABITS.—These brickly red Tanagers with the gray cheeks and the single call note, *chuck chuck*, were found in the Guadalupe Mountains in oaks and pines on the edge of the Transition Zone, especially on rocky wooded hillsides; while others were seen 300 feet higher in the yellow pines at 7,000 feet.

Near the head of the Mimbres late in May, 1906, Mr. Bailey found them "common around camp and around the G. O. S. Ranch. One came regularly to eat a piece of beef put out on the fence at the back door of the cabin" (MS).

Those seen by Major Goldman in the Burro Mountains the middle of September were feeding on wild grapes and wild cherries in a northeast slope canyon at 6,500 feet, and a pair seen by Mr. Gaut in the Capitan Mountains were high up among the balsams and spruces on the southeast slope.

In July, 1874, in Arizona, Mr. Henshaw watched the birds "as they moved slowly about in the pine tops searching for insects. . . . The old birds manifested much affection and solicitude for their progeny, flying down on the low branches and, after venting their anger in harsh notes, returned to the side of their young and led them away to a place of safety." In August, he found about half a dozen males in a grove of oaks on the outskirts of a pine forest (1875, p. 237).

COOPER SUMMER TANAGER: *Piranga rubra cooperi* Ridgway

PLATE 71

DESCRIPTION.—*Male*: Length (skins) 6.6-7.5 inches, wing 3.7-4.1, tail 2.9-3.4, bill .7-.8, tarsus .7-.8. *Female*: Length (skins) 7-7.8 inches, wing 3.8-4, tail 2.9-3.3, tarsus .8. *Adult male*: Upperparts plain dull (vermilion) red; wings hair-brown with red edgings; underparts clear light (vermilion) red; axillars and under wing coverts paler, more pinkish; bill light brown. Colors brighter in fall and winter. *Adult female*: Upperparts pale olive-grayish, tinged with yellowish on back and scapulars; underparts dull yellow. *Young male in first autumn*: Similar to adult female but more richly colored, upperparts more ochraceous, with crown, wings, and tail tinged with dull orange. *Young in juvenal plumage*: Streaked; wing with buffy band.

COMPARISONS.—The Cooper can be distinguished from the Hepatic Tanager by the nearly uniform coloration of its upperparts and the soft clear red of its underparts. (See plate 71).

RANGE.—Breeds in Lower Sonoran Zone from southeastern California, central Arizona, central New Mexico, and central western Texas south to central Nuevo

Leon and northern Durango; winters in Mexico south to Colima and Morelos. Recorded from Lower California, Brownsville, Texas, and near Denver, Colorado.

STATE RECORDS.—When Doctor Coues passed through New Mexico, in 1864, he collected for a few days, June 20–22, at Los Pinos, just south of Albuquerque, where he found the Cooper Tanager common. It was there that the specimen was obtained that afterwards made the type of this form. The type locality marks the northern limit of the regular breeding range in the Rio Grande Valley, but the species also breeds up the Gila Valley to western New Mexico (Brewster); as low as Mesilla, 3,800 feet (Merrill); at Cajon Bonito, 4,500 feet, just south of the New Mexico border (Mearns); and at Cooney, 5,500 feet (Barrell). [It was found at Chloride, 6,200 feet, and found fairly common June 1 and 2, 1924, at Carlsbad (Ligon).]

After the breeding season it was noted [on August 4, 1919, when many with young were seen in the Cuchillo Hills, northeast of Fair View, at 6,000 to 7,000 feet (Ligon)]; on August 9, 1913, it was seen in the Organ Mountains at 6,200 feet (Merrill); about the middle of August, 1903, at Sierra Grande (Howell); September 11, 1901, at Carlsbad (Bailey); September 19, 1902, at three miles north of Roswell, and September 22, 1902, at Fort Sumner (Gaut); September 27, 1908, Redrock (Goldman); and October 1, 1913, Mesilla (Merrill). This last is probably at a later date than the species usually remains in the State.

In the spring it returns about the first of May, and was noted at Cooney on May 9, 1889 (Barrell), and at Mesilla Park, May 9, 1903 (Ford).—W. W. COOKE.

NEST.—In trees, made of grasses, weeds, leaves, and catkins. Eggs: 3 or 4, green, spotted with browns and purples.

FOOD.—Insects, weeds, wild berries, and some little fruit (Merrill).

GENERAL HABITS.—The young field student may well be on his guard when among Cooper Tanagers, for the immature male, after molting the female-like yellowish dress, may acquire only a few red body feathers, or a wholly red dress. Between these extremes, as Doctor Chapman points out, "there is every degree of intergradation" and the birds arrayed in this motley wear "present a most striking appearance and are sometimes reported by inexperienced observers as 'new' or 'strange' species" (Bird-Lore, 1918, p. 153).

The Cooper Summer Tanager, Mr. Henshaw says, "seems to confine its range to the low valleys, and migrates in the south very early" (1875, p. 239). It was seen occasionally by Major Goldman "among the cottonwoods along the river near Socorro the middle of August, 1909. When a male was shot a female came near and flew back and forth from tree to tree chattering excitedly and finally flew down and alighted on the ground beside the fallen bird" (MS).

"The Tanager comes to Mesilla Park," Professor Merrill reported, "from the middle of April to the first of May, nests in June and leaves in September. It is a shy bird, the female being very rarely seen and the male seldom, considering his conspicuous color. The pairs seem to prefer isolated trees for nesting, although nests in groves are common" (MS). A nest was found by Mr. Ligon in the top branches of a walnut tree growing in a canyon bed. Its one egg was eaten and the

nest destroyed by a Woodhouse Jay. The Tanagers were abundant, Mr. Ligon found, in the cottonwoods along the Rio Grande.

A female and three young seen by Professor Merrill in Filmore Canyon, in the Organ Mountains, were flying about among the oak trees, and kept up a continual roundelay of a plaintive, whistling "tree."

In the Colorado Valley, where Doctor Grinnell found the Cooper, he says it was "difficult to discern in spite of its brilliant red attire, amid the vivid green of the new foliage of the willow thicket in which it ensconced itself . . . it attracted attention through its typical Tanager call note, '*prritit*' . . . the song was quite different, being a clear, full-toned warble more nearly like that of the Black-headed Grosbeak, yet with an individuality of its own" (1914, pp. 182-183).

FINCHES, SPARROWS, BUNTINGS, etc.: Family Fringillidae

The Finches and Sparrows being primarily seed eaters—weed seed making up the bulk of the food of adult native members of the group, though insects are fed to the young—their bills, as Doctor Coues says, approach nearest to the cone, "combining strength to crush seeds with delicacy of touch to secure minute objects" (Key). Although some of the family show a wide variation from the pure cone form, their conformity to the type will be appreciated by comparison with the flat, widely gaping bills of the Swallows, Swifts, and Goatsuckers, the long tubular bills of the Hummingbirds, and other marked forms adapted to other feeding habits. Most of the Fringillidae have a bill character seen also in Icteridae, the cutting edge of the lower mandible near the base being abruptly bent down at an angle, so hinging the bill wider open for grasping large seeds or nuts. The nostrils are mostly exposed. The wing is characterized by having only nine developed quills. Being seed eaters, the Finches and Sparrows are not so migratory as the exclusively insectivorous birds, which have to leave the north at the coming of cold weather. The coloration of different members of the family varies with their habitat, the neutral tints of the brown, streaked Sparrows making them inconspicuous in the open, while the bright colors of many of the Finches are lost in the tree tops. As a family they are good singers.

REFERENCES.—CHAPMAN, F. M., Notes on the Plumage of North American Sparrows, Bird-Lore, XII-XVII (1910-1915).—JUDD, S. D., The Relation of Sparrows to Agriculture, Biol. Surv., U. S. Dept. Agr., Bull. 15, 1901.

GROSBEAKS, etc.: Subfamily Richmondeninae

ARIZONA CARDINAL: *Richmondéna cardinalis superbus* (Ridgway)

DESCRIPTION.—*Male*: Length (skins) 8.4-9 inches, wing 3.9-4.1, tail 4.7-5, bill .8-.9. *Female*: Length (skins) 7.8-8.3 inches, wing 3.8-4, tail 4.5-4.7, bill .8.

Bill very large and stout but conic, wings very short and rounded, tail rounded. *Adult male*: Head, neck, and underparts light vermillion-red; the high crest deeper red but, except in worn plumage, with olive-gray tips; upperparts dull red (feathers partly tipped with olive-gray); lores and chin black; bill red. "The breeding dress is acquired by wear only [not molt], the male becoming brighter and redder than in winter through loss of the grayish tips" (Chapman). *Adult female*: Crest partly and wings and tail mainly dull red as in male, but tail feathers edged with olive; red of head and body replaced on upperparts by brownish gray or grayish hair-brown and on underparts by uniform tawny or clay-color; lores and chin deep grayish; under wing coverts bright rose; bill as in male. *Young in juvenal plumage*: Like female but lighter below and without grayish face and throat, bill blackish. Young male, with crest tinged with dull red and underparts with pink; young female with only wings and tail reddish.

COMPARISONS.—The adult male cardinals occurring in New Mexico may be distinguished by the amount of black around the base of the bill. In the Gray-tailed, the bill is entirely encircled by black, a narrow black frontlet connecting the lores; in the Arizona, the black circlet is broken, there being no black over the top of the bill between the lores.

RANGE.—Southeastern Arizona, southwestern New Mexico, and contiguous parts of Sonora.

STATE RECORDS.—The Arizona Cardinal, which is common in southeastern Arizona, comes into New Mexico along the Gila, and was reported by Henry at Fort Thorn, where he was from 1854 to 1858. [It was taken by Kellogg, December 14, 1917, 20 miles west of Silver City, where "the Gila River comes out of a tight box just northeast of Redrock," this box apparently limiting their distribution up the river. At Redrock, where it is a common breeder, on May 8, 1922, at least a dozen were seen and a pair taken by Kellogg, who also took another there on May 13, 1924.]

NEST.—In a bush, a vine, or a low thick tree; made loosely of twigs, leaves, grasses, and strips of bark. *Eggs*: 2 to 4, white, irregularly spotted with brown, from reddish to dark chocolate, with neutral shell tints.

GENERAL HABITS.—The Cardinals of whatever subspecies seem well known from their relationship to the familiar cage bird, noted both for brilliant color and rich voice.

[GRAY-TAILED CARDINAL: *Richmondéna cardinális canicaúdu* (Chapman)]

DESCRIPTION.—*Male*: Length (skins) 7.6–8.6 inches, wing 3.5–3.8, tail 3.8–4.4, bill .7–.8. *Female*: Length (skins) 7–8.2 inches, wing 3.2–3.7, tail 3.6–4.1, bill .7–.8. Similar to the Arizona Cardinal but with narrow black frontlet, the female with grayer back, and tail feathers broadly margined with gray instead of olive.

RANGE.—Lower Sonoran Zone from central and southwestern Texas (perhaps to southeastern New Mexico) south to Puebla and Michoacan.

STATE RECORDS.—To the southeastward the Gray-tailed Cardinal comes up the Pecos within less than 50 miles of New Mexico, and with the increased growth of trees under irrigation may gradually extend its range into the State. A specimen that can not now be located was taken near Carlsbad, June 20, 1899, by Capt. A. H. Higginson, and from its nearness to the Texas localities of *canicaudus*, may have been that subspecies.]

ARIZONA PYRRHULOXIA: *Pyrrhuloxia sinuata sinuata* (Bonaparte)

PLATE 72

DESCRIPTION.—*Male*: Length (skins) 7.4–8.4 inches, wing 3.5–3.9. *Female*: Length (skins) 6.9–7.9 inches, wing 3.5–7, tail 3.7–3.8, bill .6. *Bill short and parrot like*. *Adult male*: Body mainly grayish brown or brownish gray, with longer feathers of crest red, face, throat, median underparts, and under side of wings rose red; wings and tail largely dull red; bill yellowish in summer, horn colored in winter. *Adult female*: Similar to male but red of face and underparts wanting or only suggested; underparts buffy brown. *Young in juvenal plumage*: Like adult female but feathers more woolly in texture and underparts paler.

RANGE.—Lower Sonoran Zone from southern Arizona and southern New Mexico to extreme central western Texas and south through western Mexico to Zacatecas and Sinaloa.

STATE RECORDS.—Southern New Mexico marks the northern limit of the range of the Arizona Pyrrhuloxia. Here it is common along the Rio Grande as far as Mesilla, where eggs were found, July 10, 1913 (Merrill). [In the fall a specimen was taken in Sierra County, October 28, 1916 (Kellogg)], and two were seen November 21, 1909, at Garfield (Goldman). Early in November, 1902, two were taken at Tularosa (Gaut), which probably represents the extreme northeastern point of the range. [In the Pecos Valley it is found as far north as Lakewood (Ligon, 1916–1918).]

In the winter, specimens were taken at Mesilla Park December 7, 1911, and January 8, 1913 (Ford). On the Carlsbad Bird Reserve several were seen, January 17, 1915; [it was noted in December, 1916; also on the Rio Grande Bird Reserve (Elephant Butte), noted November 23–December 9, 1916 (Willett).]—W. W. COOKE.

NEST.—In mesquite and thorny bushes, small and compactly built of twigs, inner bark, or coarse grass, lined with a few rootlets or fine grass and fibers. *Eggs*: 3 or 4, covered with purplish brown pin points.

FOOD.—In August and September (in which months all the stomachs examined were collected) the animal food amounting to 28.81 per cent was made up almost exclusively of harmful species, among which are the most important pests of the cotton plant, the cotton worm and the cotton boll weevil. Caterpillars, grasshoppers, and weevils are its favorite insects. Practically seven-tenths of the food consisted of weed seeds, the pernicious foxtail and burr grass amounting to 43.59 per cent of the food.

GENERAL HABITS.—Among the tornillos and mesquites of the Rio Grande Valley and the lower mesa near Mesilla Park, Professor Merrill found the Arizona Pyrrhuloxia or Gray Grosbeak most abundant, and here in summer this remarkable bird with its high crest, parrot-like bill, and beautiful gray and rose plumage, as he says, “adds its charming presence markedly to the bird fauna; in winter it is an ever welcome relief from the universal gray; and in spring it is a veritable temptation to forsake the trodden paths of duty and take to the open as it perches on the top of a mesquite nearby and repeatedly calls *queet, queet, queet—queet, queet, queet, queet—quee-u, quee-u*. During the season of rearing the young, a variety of calls are given, varying from the rattling *cheek, cheek, cheek*, when molested, to soft family notes of a liquid,



ARIZONA PYRRHULOXIA

FEMALE

MALE

ARIZONA PYRRHULOXIA: *Pyrrhuloxia sinuata sinuata* (Bonaparte)

PLATE 72

DESCRIPTION.—*Male*: Length (skins) 7.4–8.4 inches, wing 3.5–3.9. *Female*: Length (skins) 6.9–7.9 inches, wing 3.5–7, tail 3.7–3.8, bill .6. *Bill short and parrot like.* *Adult male*: Body mainly grayish brown or brownish gray, with longer feathers of crest red, face, throat, median underparts, and under side of wings rose red; wings and tail largely dull red; bill yellowish in summer, horn colored in winter. *Adult female*: Similar to male but red of face and underparts wanting or only suggested; underparts buffy brown. *Young in juvenal plumage*: Like adult female but feathers more woolly in texture and underparts paler.

RANGE.—Lower Sonoran Zone from southern Arizona and southern New Mexico to extreme central western Texas and south through western Mexico to Zacatecas and Sinaloa.

STATE RECORDS.—Southern New Mexico marks the northern limit of the range of the Arizona Pyrrhuloxia. Here it is common along the Rio Grande as far as Mesilla, where eggs were found, July 10, 1913 (Merrill). [In the fall a specimen was taken in Sierra County, October 28, 1916 (Kellogg)], and two were seen November 21, 1909, at Garfield (Goldman). Early in November, 1902, two were taken at Tularosa (Gaut), which probably represents the extreme northeastern point of the range. [In the Pecos Valley it is found as far north as Lakewood (Lyon, 1916 1918).]

In the winter, specimens were taken at Mesilla Park December 7, 1911, and January 8, 1913 (Ford). On the Carlsbad Bird Reserve several were seen, January 17, 1915; [it was noted in December, 1916; also on the Rio Grande Bird Reserve (Elephant Butte), noted November 23–December 9, 1916 (Willett).]—W. W. COOKE.

NEST.—In mesquite and thorny bushes, small and compactly built of twigs, inner bark, or coarse grass, lined with a few rootlets or fine grass and fibers. *Eggs*: 3 or 4, covered with purplish brown pin points.

FOOD.—In August and September (in which months all the stomachs examined were collected) the animal food amounting to 28.81 per cent was made up almost exclusively of harmful species, among which are the most important pests of the cotton plant, the cotton worm and the cotton boll weevil. Caterpillars, grasshoppers, and weevils are its favorite insects. Practically seven-tenths of the food consisted of weed seeds, the pernicious foxtail and burr grass amounting to 43.59 per cent of the food.

GENERAL HABITS.—Among the tornillos and mesquites of the Rio Grande Valley and the lower mesa near Mesilla Park, Professor Merrill found the Arizona Pyrrhuloxia or Gray Grosbeak most abundant, and here in summer this remarkable bird with its high crest, parrot-like bill, and beautiful gray and rose plumage, as he says, "adds its charming presence markedly to the bird fauna; in winter it is an ever welcome relief from the universal gray; and in spring it is a veritable temptation to forsake the trodden paths of duty and take to the open as it perches on the top of a mesquite nearby and repeatedly calls *queet, queet, queet—queet, queet, queet, queet—quee-u, quee-u*. During the season of rearing the young, a variety of calls are given, varying from the rattling *cheek, cheek, cheek*, when molested, to soft family notes of a liquid,



ARIZONA PYRRHULOXIA

FEMALE

MALE

purring, interrogative character" (MS). At one nest found by Professor Merrill, while the female was brooding her eggs, the male flamed about with various improvisations of his usual song.

When telling us of the Pyrrhuloxia met with in the early survey days, Doctor Heermann speaks of its "raising its crest erect as it moves actively about in search of food" (1859, No. 1, p. 16). These crest movements, on the part of birds fortunate enough to possess such guides to their emotions, always add a delightful touch of individuality and vivacity.

ADDITIONAL LITERATURE.—TORREY, BRADFORD, *Nature's Invitation*, 274-276, 1904.

TEXAS PYRRHULOXIA: *Pyrrhuloxia sinuata texana* Ridgway

DESCRIPTION.—*Male*: Length (skins) 7.5-8.1 inches, wing 3.5-3.9, tail 3.7-4.2, bill .6-.7. *Female*: Length (skins) 7.1-8.1 inches, wing 3.4-3.8, tail 3.3-4.3, bill .6. *Adult male*: Similar to the Arizona Pyrrhuloxia, but bill larger and stouter and coloration darker; *region around base of bill decidedly dusky; upperparts dark gray. Adult female*: Similar to the female Arizona, but upperparts darker and grayer, the anterior underparts and sides strongly suffused with gray.

RANGE.—Lower Sonoran Zone in southeastern New Mexico, southern Texas, and northeastern Mexico.

STATE RECORDS.—Taken 50 miles southeast of Carlsbad and observed at Carlsbad (Ligon).

ROSE-BREASTED GROSBEAK: *Hedymeles ludovicianus* (Linnaeus)

DESCRIPTION.—*Male*: Length (skins) 6.5-7.2 inches, wing 3.8-4.1, tail 2.9-3, bill .6-.7. *Female*: Length (skins) 6.7-7 inches, wing 3.7-4, tail 2.7-2.9, bill .6-.7. Bill extremely heavy, short, conical. *Adult male in summer*: Head, neck, back, and scapulars, uniform black, rump and upper tail coverts white, tail and wings black and white, tail with white on ends of outer feathers, wings with two white bars, white patch at base of primaries, and white tips of tertials; under wing coverts and axillars, and patch on chest, rose red; rest of underparts white; bill light brownish, legs and feet grayish. *Adult male in winter*: Upperparts brown, streaked with black, wings and tail much as in summer; underparts brownish, the foreparts and sides streaked, chest tinged with rose-color. *Adult female (summer and winter)*: Similar to adult male in winter, but brown of head cut with buffy or whitish stripes; under wing coverts and axillars yellow instead of rose-pink. *Young male in first winter*: Like adult female but under wing coverts rose-pink instead of saffron and usually some pink on the breast. The full mature breeding plumage is not acquired until the second spring.

RANGE.—Breeds in Lower Canadian and Transition Zones from south-central Mackenzie, northern Manitoba, central Ontario, southern Quebec, and Cape Breton Island south to Georgia (in mountains), to New Jersey, Ohio, Missouri, and central Kansas; winters from southern Mexico and Yucatan to Colombia, Venezuela, and Ecuador; "rare, sporadic visitant" to California, accidental to Arizona, New Mexico, and Colorado.

STATE RECORDS.—Although the Rose-breasted Grosbeak has been reported as an accidental visitor to Arizona and Colorado, apparently the first record for New Mexico comes from Kellogg, who saw a full-plumaged male, May 20, 1923, at

Warm Springs Ranch, 25 miles southeast of Silver City. It was in company with Black-headed Grosbeaks. He was able to get within 20 feet of it so that its rose breast and white rump were clearly seen (1923, p. 182).

ROCKY MOUNTAIN BLACK-HEADED GROSBEAK: *Hedýmeles melanocéphalus pápago* Oberholser

PLATE 73

DESCRIPTION.—*Male:* Length (skins) 6.6–7.7 inches, wing 3.7–4.3, tail 2.8–3.4, bill .6–.8. *Female:* Length (skins) 6.1–7.8, wing 3.7–4.1, tail 2.7–3.4, bill .6–.8. Bill extremely heavy, tail shorter than wing, feet short and stout. *Adult male in summer:* Upperparts mainly black, with cinnamon-brown collar and rump (sometimes



From Biological Survey

FIG. 114. Black-headed Grosbeak
Singing his beautiful song

with brown stripe back of eye, through middle of crown, and on back); tail and wings black, tail with large white patches on outside feathers, wings with three white patches (on coverts and base of primaries), and with white tips to tertials; underwing coverts and axillars lemon-yellow, underparts tawny or buffy cinnamon, becoming yellow on belly; bill bluish white at base above, legs and feet bluish gray. *Adult male in winter:* Upperparts with more cinnamon or buffy, crown usually with more or less buffy feather edging. *Adult female in summer:* Upperparts brownish or olive, streaked on head and back; tail and wings grayish brown with white markings restricted on tail, sometimes obsolete, underwing coverts lemon-yellow, underparts tawny or dull buffy, usually yellowish (sometimes white) on belly; sides and flanks streaked. *Adult female in winter:* Similar, but with the buff or brown more pronounced and lateral crown stripes streaked with black. *Young male:* Similar to adult female but eye and cheek stripes whiter, cheeks and lateral crown stripe brownish black, underparts paler and without yellow.

RANGE.—Breeds in Transition and Upper Sonoran Zones from southern Saskatchewan,

eastern Idaho, Montana, and central North Dakota to Nebraska south to central-western Texas, New Mexico, Arizona, and Nevada; in winter from Durango to Puebla and probably to southern Mexico. Recorded from British Columbia.

STATE RECORDS. The Black-headed Grosbeak breeds north and south entirely across New Mexico, and east to the Sacramento Mountains (Green), the Capitan Mountains (Gaut), Montoya (Bailey), Sierra Grande, and Oak Canyon (Howell). Though the actual observations at these last two places were made after fall migration had begun, it is probable that the species had nested near where it was noted. [In the Sangre de Cristo Range it was observed sparingly along the main water-courses from 7,000 to 8,000 feet. On June 22, 1919, one was seen on the Little Rio Grande at 7,400 feet. On July 9 and 19, it was seen rather commonly at Valley Ranch on the Pecos, where it was apparently feeding young (Ligon). In the Santa

Fe region it is very common. Two or three pairs nest on the Indian School campus. Nests are common in the willows along the streams and in the scrub oaks on the mountain sides up to 10,500 feet (Jensen, 1923).] It is most common in the summer at 6,000 to 8,000 feet. [The center of its abundance at the breeding season seems to be 6,000 to 6,500 feet (Ligon, 1916-1918). Males were seen at Lake Burford, 7,700 feet, June 2 and 9, 1918 (Wetmore)]. It was seen June 19, 1909, at 8,500 feet on Bear Ridge in the Zuni Mountains; a few days later at 8,600 feet on Mount Sedgwick (Goldman); and July 20, 1903, at 8,700 feet on the Pecos (Bailey). [Its earliest nesting date above 6,000 feet—at 6,500 feet west of Chloride, in the Black Range—was May 26, 1916, with three slightly incubated eggs. Laying, however, is generally about June 1 (Ligon, 1916-1918). Fresh sets are found May 20-July 1 (Jensen).] Young in the nest were noted, June 15, 1903, at Montoya, at about 7,600 feet (Bailey). It breeds down to 5,600 feet in the Animas Mountains (Goldman), to 4,800 at Dog Spring (Mearns), and to 3,800 feet at Mesilla (Merrill).

It does not winter anywhere in the United States, and begins its southward migration late in July; even by the middle of July it is already wandering away from the nesting site. It was taken on August 5, 1903, at 10,000 feet below Pecos Baldy (Weller); August 16, 1904, at 9,500 feet on Red River (Gaut). It was noted in the Santa Clara Canyon, August 21-26, 1906, and near Frisco, August 31, 1908 (Bailey). Few individuals are left in the State after the first of September. It was seen near Willis, September 2, 1883 (Henshaw); at Oak Canyon, September 2, 1903 (Howell); and at Ruidoso, September 10, 1898 (Barber). The last noted at Cooney in 1889 was on September 10 (Barrell). The species is therefore one of the earliest migrants to leave the State, but since laggards have been noted in Colorado even to October it is evident that these New Mexico dates do not represent the latest that it remains in the State.

On the return in the spring, it is one of the latest migrants. It was noted at Chloride, April 28, 1915 (Ligon); a specimen was taken May 3, 1914, at Silver City (Kellogg); [it was noted there May 10, 1920 (Ligon)]; it is recorded as arriving at Cooney May 7, 1889, and at Carlisle May 4, 1890 (Barrell); it was taken May 6 and 8, 1904, at Rinconada (Surber); and at Willis, May 16, 1900 (Birtwell). But at the upper limit of the breeding range near Halls Peak, 8,000 feet, the first was not seen until June 12, 1895 (Barber).—W. W. COOKE.

NEST.—Usually in chaparral, made loosely of sticks, weeds, or rootlets. *Eggs*: 3 or 4, pale bluish white, thickly spotted with brown.

FOOD.—“It feeds upon cherries, apricots, and other fruits and also does some damage to green peas and beans; but it is so active a foe to certain horticultural pests that we can afford to overlook its faults. Several kinds of scale insects are freely eaten, and one, the black olive scale, constitutes a fifth of the total food. In May, many cankerworms and codling moths are consumed, and almost a sixth of the bird’s seasonal food consists of flower beetles, which do incalculable damage to cultivated flowers and to ripe fruit. For each quart of fruit consumed it destroys in actual bulk more than 1½ quarts of black olive scales and 1 quart of flower beetles besides a generous quantity of codling-moth pupae and cankerworms. It is obvious that this pays many times over for the fruit destroyed” (Henshaw, 1914, p. 680). Alfalfa weevils are also eaten (Kalmbach). It is another enemy of the potato beetle and the hairy caterpillars, and 58.75 per cent of its food consists of harmful insects (McAtee).

GENERAL HABITS.—The Black-headed, brown-breasted Grosbeak is characteristically a bird of the Upper Sonoran oak, juniper, and nut pine region, and of the thick cottonwood groves and deciduous trees

and bushes along streams. In the Capitan Mountains during the summer of 1903, Mr. Gaut found it occasionally at various places, but more commonly in the foothills on the south side among the alligator-barked juniper and the blue oak.

At Montoya we found the conspicuous black-coated male, as seems to be his custom, brooding young in a hackberry in place of his protectively colored brown, streaked mate. The nest, which was made of crinkly rootlets with a little grass, was so thin that we could see the young through it. On Bitter Creek a female taken August 16, 1904, had not yet begun its molt, although its plumage was greatly worn, some of the feathers of its head and tail being reduced almost to shafts. Its stomach contained small seeds. Another bird was seen eating a locust.

At Mesilla Park, the Black-headed Grosbeak is "not as numerous as the Blue Grosbeak," Professor Merrill says, and is more shy, "keeping to a great degree to the regions of denser vegetation along the river. One shot from the edge of an oat field, July 21, 1913, had his stomach well filled with oats plus a few beetles. The numbers of the species are so small that no considerable damage is done. Occasionally it is met with in orchards where it may take some fruit" (MS). To prevent injury to cultivated fruits, Mr. McAtee says, bird netting can be used in small orchards, but in large orchards wild fruit-bearing trees and shrubs, such as mulberry, serviceberry, and elderberry, should be planted here and there, "by means of which almost complete protection to cultivated fruit can be obtained. The chief essential is that the decoy trees shall be early bearing species, for it is the universal testimony that almost all of the damage done is to early fruit" before wild fruits ripen. The early bearing varieties of mulberry are among the best for the purpose, as the mulberry is a favorite of frugivorous birds.

The call of the Black-headed is as thin and weak as his song is rich and full of personality. At its best, the song excels in finish and musical quality. One of the birds that I frequently listened to in southern California, doubtless singing to his mate on the nest hidden among the tasseled oak trees filled with golden sunlight, suggested a fervid but conscious human musician. As a violinist, lingering to perfect a note, draws his bow again and again over the strings, so this rapt musician dwelt lovingly upon his highest notes, trolling them over till each was more exquisite and tender than the last, and the ear was charmed with his rare love song. In Arizona, Mr. Henshaw had the good fortune to listen to some of the delightful concerts with which the birds closed each day. In the pine woods near Camp Apache, he tells us, "just after the sun had fairly sunk below the woods, these Grosbeaks ascended to the tops of the tallest pines, and thence sent



Photograph by H. W. Nash

ROCKY MOUNTAIN BLACK-HEADED GROSBEAK

The sparrowy looking brown mother bird with food in her bill for her fuzzy white nestlings

forth their sweet strains till long after dusk had settled down upon the deep forest" (1875, p. 297).

ADDITIONAL LITERATURE.—FINLEY, W. L., American Birds, 45-53, 1907; Educational Leaflet 45, Nat. Assoc. Audubon Soc.; Condor, VI, 145-148, 1904.—HEAD, ANNA, Condor, IV, 119-121, 1902.—MCATEE, W. L., Biol. Surv., U. S. Dept. Agr., Bull. 32, 60-77, 1908.—MERRIAM, F. A., A-Birding on a Bronco, 170, 1896 (song).

ARIZONA BLUE GROSBEEK: *Guiraca caerulea interfusa* Dwight and Griscom

PLATE 62

DESCRIPTION.—*Male*: Length (skins) 5.9-7 inches, wing 3.4-3.8, tail 2.6-3.1, bill .5-.7. *Female*: Length (skins) 5.6-6.5 inches, wing 3-3.5, tail 2.4-2.8, bill .5-.7. Bill less swollen than in the Black-headed Grosbeak, the upper outline nearly straight; wings long and pointed; tail shorter than wings. *Adult male in summer*: Plain purplish blue, back streaked with black, wings and tail blackish with dull bluish edgings, wings with two brownish bands, the wider one usually .2 to .3 inches wide and decidedly paler than the narrow one; under tail coverts edged with white; a narrow black line around base of bill, bill grayish blue. *Adult male in winter*: Essentially like summer male but blue more or less obscured by brown and buffy feather margins, especially on back and breast, feathers of belly with buffy or whitish margins and outside tail feathers tipped with white. *Adult female and young*: Olive-brown, back streaked, female usually more or less tinged with blue, tail and wings dusky, tail with bluish edgings, wings with brownish edgings and two light bands; underparts brownish buffy or clay-color, darkest on chest; bill brownish. *Immature male*: Various intermediate in coloration between adult female and adult male according to age.

RANGE.—Breeds in Upper and Lower Sonoran Zones from southern Nevada, Colorado, southwestern South Dakota, and Nebraska south to central Texas, southern Arizona, southeastern California, and Oaxaca; winters from southern Sonora to Costa Rica.

STATE RECORDS.—The warmer parts of New Mexico are inhabited in the summer by the Arizona Blue Grosbeak, which occurs north to Silver City (Fisher); Roswell (Bailey); [between Roswell and Fort Sumner June 16-21, 1918 (Ligon)]; Ribera and Pecos (Bailey); Rinconada (Surber); near Taos (Bailey); Espanola (Surber); [Albuquerque (Ligon)]; and Rio Puerco (Hollister). It breeds at Mesilla Park (Merrill), at Carlsbad (Bailey), its breeding altitude ranging from 3,100 feet at Carlsbad to 6,000 feet at Rinconada and Silver City. The birds seen at Taos, 6,900 feet July 14, 1904, and between Glorieta and Pecos, 7,000 feet, July 11, 1903, were probably breeding birds. [They breed commonly in northern Santa Fe County in orchards and in willows along streams. Fresh eggs are found June 15-August 1 (Jensen, 1922). In eastern New Mexico they were not common but observed in irrigation districts, especially where there were willows, May 27-June 22, 1924 (Ligon).] A nest with eggs, evidently a second set, was found July 22, 1901, at Carlsbad (Bailey).

Three birds noted August 16, 1907, at Shiprock (Gilman), were undoubtedly wanderers, being here nearly 200 miles from the nearest known breeding range on the east and about the same on the south. The species is an early fall migrant, and most of the individuals have left the State by the end of August. Some dates of the last noted are: Rio Puerco, September 4, 1905 (Hollister); Albuquerque, September 11, 1900 (Birtwell); a flock of old and young near Hondo, September 17, 1902 (Hollister); and one at Mesilla, October 12, 1913 (Merrill).

In the spring migration it was seen at State College, May 7, 1915 (Merrill).—
W. W. COOKE.

NEST.—In tall weeds, vines, bushes, willows, and fruit trees; made of grasses and rootlets. *Eggs*: 3 to 4, pale greenish blue or bluish white, unspotted.

FOOD.—In summer the insect food amounts to about twice that of the vegetable. It includes the purslane caterpillar, which sometimes attacks garden and fruit crops; the cotton cutworm, which attacks both cotton and tomatoes; destructive bugs such as squash bugs, stink bugs, tree hoppers, and cicadas; injurious beetles, including June bugs and their white grub larvae; weevils, leaf beetles, wood borers, and click beetles; but most important of all, grasshoppers, to the extent of 27.2 per cent of the total food, being also fed to the nestlings. Of the vegetable food, 6 per cent is wild fruit, 14.25 per cent grain and 18.05 per cent weed seed. "It consumes almost five times as great a bulk of injurious insects as of grain. Without doubt the farmer could afford to pay for the destruction of these insects with grain in the reverse ratio and yet make a large profit by the bird's services" (McAtee).

GENERAL HABITS.—In California, where Mr. Tyler found the California Blue Grosbeak, he says that "while tramping around in late spring among the rank weeds and grass along the ditches or at the edge of tule ponds, a bird lover in the San Joaquin Valley is often attracted by a sudden explosive *spink* from a large-billed, blue-coated bird, and very often this call is answered in a more subdued *pink* by a brown-colored bird, otherwise quite similar in appearance to her mate" (1913, p. 88). In New Mexico and especially Arizona, Mr. Henshaw found the Western Blue Grosbeak "on heavily brushed streams from the time they made their appearance at the base of the mountains till . . . the waters finally disappeared in the thirsty sands of the plains below." The song, as he describes it, at its finest is possessed of much sweetness of tone, but lacks the full rich mellowness and variety of modulation so conspicuous in the songs of the other grosbeaks.

At Mesilla Park, where it is the commonest grosbeak, Professor Merrill notes that its "cheery song can be heard from orchards, groves, bosques, mesquites, thickets, and sunflower patches," and in any of these its nest may be found. The young begin flying the first week in July and the birds leave in October, returning late in April (MS). In the city of Albuquerque, it is pleasant to hear, the Blue Grosbeak has been found by Mr. Ligon feeding young in a cottonwood on North Third Street.

About Santa Fe, Mr. Jensen has discovered, the Blue Grosbeak, like the Crested Flycatcher, uses cast-off snake skin for its nest. In twenty-three nests located during a period of five years, twenty-one had snake skin as a foundation.

LAZULI BUNTING: *Passerina amoëna* (Say)

PLATE 74

DESCRIPTION.—*Male*: Length (skins) 5-5.5 inches, wing 2.8-3, tail 2.1-2.3, bill .4. *Female*: Length (skins) 5-5.4 inches, wing 2.6-2.8, tail 2-2.3, bill .4. Bill small, under mandible deeper than upper. *Adult male*: *Upperparts* bright tur-

FINCHES, SPARROWS, BUNTINGS: LAZULI BUNTING 679

quoise-blue changing to greenish blue, darker and duller on middle of back where fresh feathers are margined with rusty; wings and tail blackish with blue edgings and wings with two white bars; *breast and sometimes sides brownish*; rest of underparts white. *Adult female*: Upperparts flaxen-brown, back sometimes streaked, and rump tinged with greenish blue; wings and tail dusky with greenish blue edgings, two wing bars buffy; anterior underparts pale buffy, deeper on chest and fading to white on belly. *Young in juvenal plumage*: Grayish brown above, whitish tinged with buff below, breast usually obscurely streaked.

RANGE.—Breeds in Transition and Upper Sonoran Zones from southern British Columbia, southern Alberta, southeastern Saskatchewan, Montana, and western North Dakota south to western Texas, northern New Mexico, Arizona (probably breeds) and southern California; winters in Mexico south to Cape San Lucas and Valley of Mexico.

STATE RECORDS.—In the light of the commonness of the Lazuli Bunting in Colorado, its records for New Mexico are surprisingly few. There seem to be only three sure breeding records, one at Fort Wingate, where nearly grown young were found, June 29, 1905 (Hollister); [one on the Pecos River at about 7,000 feet, where a pair were feeding young in July, 1916 (Scott); one at Santa Fe, where a nest with eggs was found, June 13, 1921, in willows on the river bank at 7,100 feet (Jensen). An adult female was taken and two others seen with her in Silver City, May 1, 1925 (Kellogg)]. A pair was noted at Rinconada May 3, 1904 (Surber); it was seen at Santa Fe May 6, 1903 (Merriam); [one was seen, May 6, 1920, at a tank 15 miles southwest of Hachita (Ligon)]; it was noted near Santa Rosa between May 19 and June 8, 1903 (Surber); and several were seen near Taos July 10, 1904 (Bailey). One was seen August 8, 1883, at Willis, 7,800 feet (Henshaw)—the highest record for the State—and it has been noted at Fort Stanton (Henry), Shiprock (Gilman), Apache (Anthony), and Albuquerque (Bailey).

It winters south of the United States, and most of the birds have left New Mexico by the end of August. A late record is that of the specimen taken September 16, 1851, at Zuni (Woodhouse).—W. W. COOKE.

NEST.—Usually near water, often attached to upright stalks of weeds, or in rose bushes, sage, willows, manzanitas, and other bushes; made of inner bark and plant fibers, and lined sometimes with hair. *Eggs*: 3 or 4, plain bluish white or pale greenish blue; sometimes spotted.

FOOD.—"The products of the farm seldom enter into its diet, while among its customary food may be found the seeds of troublesome weeds and many noxious insects including the alfalfa weevil" (Kalmbach). The codling moth is also eaten (McAtee).

GENERAL HABITS.—Though not interested in sagebrush, the beautiful blue and brown Lazuli Bunting, who has a preference for "fertile valleys" and brooksides, is attracted by wild rose, wild plum, and gooseberry thickets, willows, alders, and chapparral. Here he gives his call, a peremptory *quit* or a less excited *cluck*, and sings his bright musical finch song, with a burr that reminds one of the pretty brogue of the Lark Sparrow. He was singing gaily in the wild plum and willow thickets bordering the irrigation ditches near Taos at the time of our visit. His nest, which is near the ground, it is interesting to learn, when abandoned has sometimes been utilized by his little fur-clad neighbors, the dainty white-footed mice.

ADDITIONAL LITERATURE.—MERRIAM, F. A., A-Birding on a Bronco, 81-83, 189-193, 1896.—MILLER, O. T., A Bird Lover in the West, 262-268, 1894.—SCOTT, C. D. W., Educational Leaflet 131, Nat. Assoc. Audubon Soc.

PAINTED BUNTING; NONPAREIL: *Passerina ciris* (Linnaeus)

PLATE 74

DESCRIPTION.—*Male*: Length (skins) 5-5.6 inches, wing 2.7-2.9, tail 2.1-2.2, bill .4. *Female*: Length (skins) 4.7-5.5 inches, wing 2.5-2.8, tail 1.9-2.1, bill .4. *Adult male*: Head and back of neck purplish blue in sharp contrast to yellowish green or apple-green of back and scapulars, rump and upper tail coverts dull red; tail dusky reddish, wing coverts parrot-green, reddish and purplish blue; orbital ring and underparts bright red. *Adult female*: Upperparts plain dull green, underparts olive-yellow, brighter yellow on belly. *Young in juvenal plumage*: Dusky grayish brown above, grayish below, belly buffy or whitish. In their first breeding season, the males resemble the female, except for the occasional presence of a few blue feathers about the head.

RANGE.—Breeds in Lower Austral Zone from southern Kansas, central Arkansas, and southeastern North Carolina south to Gulf coast, Texas, and southeastern New Mexico; casual in southern Arizona, southeastern California, and southern Illinois; winters in southern Florida (a few), Bahamas, Cuba, and from central Mexico and Yucatan to Panama.

STATE RECORDS.—In its range in New Mexico the Painted Bunting is confined to the lower part of the valleys of the Pecos and the Rio Grande. In the former it was noted in July, 1901, at Carlsbad (Bailey) as a fairly common summer resident. In the Rio Grande Valley it is a common breeder north to Mesilla (Merrill), where it arrived about the first of May and left in 1913 on September 30 (Merrill).—W. W. COOKE.

NEST.—In hackberry, cat-claw, or chaparral, about six feet from the ground; made of grasses and sometimes leaves, lined with finer grasses and hairs. *Eggs*: 4 or 5, creamy to bluish white, spotted with purple and reddish brown.

FOOD.—Practically all of the vegetable food is weed seeds, two-thirds of it being the seeds of foxtail grass, one of the worst weed pests. The animal food also is composed almost exclusively of injurious species, more than a fourth of it consisting of the two greatest pests of the cotton crop—the cotton worm and the cotton boll weevil (McAtee).

GENERAL HABITS.—At our camp above the Pecos River, near Carlsbad, all through the hottest days the loud clear song of a Nonpareil, the familiar cage bird, came up from the mesquite tops on the bank of the river; and as we looked down on him we could see now the bright red of his breast and now the green sheen of his back; surprisingly gorgeous colors said to be used with telling effect in courtship.

DICKCISSEL: *Spiza americana* (Gmelin)

DESCRIPTION.—*Male*: Length (skins) 5.5-6.3 inches, wing 3.1-3.4, tail 2-2.4, bill .6. *Female*: Length (skins) 5.5-5.7 inches, wing 2.9-3, tail 2-2.2, bill .5-.6. *Adult male*: Head, back, and sides of neck, gray, top of head usually more or less olive-green, back and scapulars brownish streaked with brown and black, rump grayish, unstreaked, wings and tail dusky, with light edgings, wings with reddish



LAZULI BUNTING
FEMALE MALE

PAINTED BUNTING
MALE FEMALE

TERATURE.—MERRIAM, F. A., A-Birding on a Bronco, 81-83,
 1894. —MILLER, O. T., A Bird Lover in the West, 262-268, 1894.—
 D. W., Educational Leaflet 131, Nat. Assoc. Audubon Soc.

PAINTED BUNTING; NONPAREIL: *Passerina ciris* (Linnaeus)

PLATE 74

DESCRIPTION.—*Male*: Length (skins) 5-5.6 inches, wing 2.7-2.9, tail 2.1-2.2, bill .4. *Female*: Length (skins) 4.7-5.5 inches, wing 2.5-2.8, tail 1.9-2.1, bill .4. *Adult male*: Head and back of neck purplish blue in sharp contrast to yellowish green or apple-green of back and scapulars, rump and upper tail coverts dull red; tail dusky reddish, wing coverts parrot-green, reddish and purplish blue; orbital ring and underparts bright red. *Adult female*: Upperparts plain dull green, underparts olive-yellow, brighter yellow on belly. *Young in juvenal plumage*: Dusky grayish brown above, grayer below, belly buffy or whitish. In their first breeding season, the males resemble the female, except for the occasional presence of a few blue feathers about the head.

RANGE.—Breeds in Lower Austral Zone from southern Kansas, central Arkansas, and southeastern North Carolina south to Gulf coast, Texas, and southeastern New Mexico; casual in southern Arizona, southeastern California, and southern Illinois; winters in southern Florida (a few), Bahamas, Cuba, and from central Mexico and Yucatan to Panama.

STATE RECORDS.—In its range in New Mexico the Painted Bunting is confined to the lower part of the valleys of the Pecos and the Rio Grande. In the former it was noted in July, 1901, at Carlsbad (Bailey) as a fairly common summer resident. In the Rio Grande Valley it is a common breeder north to Mesilla (Merrill), where it arrived about the first of May and left in 1913 on September 30 (Merrill).—W. W. COOKE.

NEST.—In hackberry, cat-claw, or chaparral, about six feet from the ground; made of grasses and sometimes leaves, lined with finer grasses and hairs. *Eggs*: 4 or 5, creamy to bluish white, spotted with purple and reddish brown.

FOOD.—Practically all of the vegetable food is weed seeds, two-thirds of it being the seeds of foxtail grass, one of the worst weed pests. The animal food also is composed almost exclusively of injurious species, more than a fourth of it consisting of the two greatest pests of the cotton crop—the cotton worm and the cotton boll weevil (McAtee).

GENERAL HABITS.—At our camp above the Pecos River, near Carlsbad, all through the hottest days the loud clear song of a Nonpareil, the familiar cage bird, came up from the mesquite tops on the bank of the river; and as we looked down on him we could see now the bright red of his breast and now the green sheen of his back; surprisingly gorgeous colors said to be used with telling effect in courtship.

DICKCISSEL: *Spiza americana* (Gmelin)

DESCRIPTION.—*Male*: Length (skins) 5.5-6.3 inches, wing 3.1-3.4, tail 2-2.4, bill .6. *Female*: Length (skins) 5.5-5.7 inches, wing 2.9-3, tail 2-2.2, bill .5-.6. *Adult male*: Head, back, and sides of neck, gray, top of head usually more or less olive-green, back and scapulars brownish streaked with brown and black, rump grayish, unstreaked, wings and tail dusky, with light edgings, wings with reddish



LAZULI BUNTING
FEMALE MALE

PAINTED BUNTING
MALE FEMALE

brown epaulettes; forehead, eye streak, and upper part of malar streak yellowish, chin and lower part of malar streak white, throat with black patch (variable in size and shape), rest of underparts more or less tinged with yellow; bill bluish gray above. *Adult female*: Similar, but duller, upperparts browner, head and rump streaked, the black throat patch usually wanting, and yellow more restricted or wanting except on breast. *Young in juvenal plumage*: Difficult to distinguish from an English Sparrow except by its more pointed tail feathers.

RANGE.—Breeds chiefly in Austral Zones, from north-eastern Wyoming, southern Saskatchewan, Manitoba, northwestern North Dakota, southern Michigan, and southern Ontario south to southern Mississippi and Texas; very rare east of Alleghanies; winters in Panama, Colombia, and Venezuela, migrating across the Gulf of Mexico and through Mexico and Central America. Recorded from southern British Columbia, Lower California, and Arizona.

STATE RECORDS.—A single specimen of the Dickcissel was seen and heard singing June 30, 1900, at Shoemaker, a few miles northeast of Las Vegas (Dawson); and several were seen September 3-14, 1901, at Carlsbad (Bailey); [a male was taken September 25, 1922, in Silver City, in company with Western Chipping Sparrows (Kellogg); several were seen and one killed by a cat September 16, 1926, in a Santa Fe garden, and one banded May 7, 1927, at Santa Fe (Jensen)]. Since these are the only credible records of the occurrence of the species in New Mexico, it follows that it must be a rare visitor in the State.—W. W. COOKE.

NEST.—In bushes or low weeds on meadows or prairies, made largely of dried grasses. *Eggs*: 3 to 5, plain pale blue.

GENERAL HABITS.—The Dickcissel, the songster of the northern grainfields, is seen in great flocks in migration as it crosses the prairies of Texas, and it is good to know that migrating stragglers may be looked for in New Mexico.

ADDITIONAL LITERATURE.—CRABBE, E. D., *Auk*, XL, 606-609, 1923 (nesting).—GROSS, A. O., *Auk*, XXXVIII, 1-26, 163-184, 1921.

OLD-WORLD SPARROWS: Subfamily Passerinae

ENGLISH SPARROW: *Passer domesticus* (Linnaeus)

DESCRIPTION.—*Length*: 5.5-6.2 inches, wing about 2.8-3, tail 2.3-2.5. *Adult male*: Top of head grayish, eye streak, throat and chest patch, black, cheeks white, patch from eye to nape bright chestnut; wings with two white bands; rest of upperparts rufescent brown, back streaked with black; underparts dull gray. *Adult female*: Crown and hind-neck grayish brown or olive, with light eye streak; back like male but brown, less rufescent; underparts brownish white or gray.

RANGE.—Great Britain, introduced and naturalized at least in Canada and United States, from Atlantic to Pacific; also Nova Scotia, southern Greenland, Bahamas, Cuba, Lower California, Bermudas, and throughout Argentina.

STATE RECORDS.—Abundant generally in inhabited parts of the State (Ligon, 1918).



FIG. 115. Dickcissel

Note the cutting edge of the under mandible, characteristic of the Fringillidae, near the base abruptly bent down at such an angle that it hinges wider open for grasping large seeds. (See p. 670.)

NEST.—About houses, or in trees; bulky, made largely of dried grasses. *Eggs*: 4 to 7, thickly spotted with dark brown and purplish.

FOOD.—Of 522 stomachs examined, 22 contained wheat, 327 oats (doubtless mostly from horse droppings), 71 corn, 57 fruit seed (mainly mulberries), 102 grass seed, and 85 weed seed. The destruction of weed seed counts in its favor, and in



From Biological Survey

FIG. 116. English Sparrows (male and female)
In unlawful possession of a nesting box provided for a
native bird

exceptional cases it has been found useful as a destroyer of insect pests; but under normal conditions its choice of insects is often unfavorable; for in the examination, while 47 stomachs contained noxious insects, 50 contained beneficial, and 31 insects of no economic importance. Moreover, it destroys fruit, as cherries, grapes, pears, and peaches, buds and flowers of cultivated trees, shrubs, and vines; in the garden it eats seeds as they ripen, and nips off tender young vegetables, especially peas and lettuce as they appear above ground. It also damages wheat and other grains, whether newly sown, ripening, or in shocks.

GENERAL HABITS.—As Doctor Dearborn puts it baldly, the English Sparrow, "like the rat among mammals, is cunning, destructive, and filthy." But its most serious fault is its attitude toward our native birds. As he says, "it reduces the number of some of our most useful and attractive native birds, as Bluebirds, House Wrens, Purple Martins, Tree Swallows, Cliff Swallows, and Barn Swallows, by destroying their eggs and young and by usurping their nesting places. It attacks other familiar species, as the Robin, Red-eyed Vireo, Catbird, and Mockingbird, causing them to desert parks and shady streets of towns.

Unlike our native birds whose place it usurps, it has no song, but is noisy and vituperative. It defiles buildings and ornamental trees, shrubs, and vines with its excrement and with its bulky nests. The evidence against the English Sparrow is, on the whole, overwhelming, and the present unfriendly attitude of the public toward it is reflected in our State laws. Nowhere is it included among protected birds" (1912, pp. 5-6).

In New Mexico, Mr. Ligon states, it is not only abundant in towns and cities like Carlsbad and Albuquerque, but has invaded the rural districts, being found at ranches and farmhouses where it injures "garden truck and fruit." It is a great pest, but in trying to get rid of it there is danger of confusing it with valuable native sparrows. For this reason it is peculiarly important that children as well as adults should be sure of the plumage of both the male and female English Sparrow.

To help some of the smaller native birds, as House Wrens, in their struggle with it, nesting boxes can be given them with entrance holes too small for the Sparrow. The best way, however, is to reduce the numbers of Sparrows. As their flesh is palatable and their numbers make up for their small size, they could be used to advantage in restaurants, an adequate supply being obtained by trapping. During the spring and summer of 1919, Mr. Jensen destroyed 1,020 eggs on the campus of the Santa Fe Indian School (1923b, p. 462). The best methods of trapping and poisoning are given in Dr. Ned Dearborn's paper on the English Sparrow as a Pest, Farmers' Bulletin 493, which will be sent on application to the U. S. Department of Agriculture, Washington, D. C.

ADDITIONAL LITERATURE.—BERGTOLD, W. H., Auk, XXIX, 334, 1912.—JENSEN, J. K., Auk, XLII, 591, 1925.—PEARSON, T. G., Educational Leaflet 90, Nat. Assoc. Audubon Soc.

FINCHES, etc.: Subfamily Carduelinae

ROCKY MOUNTAIN EVENING GROSBEAK: *Hesperiphona vespertina warreni* Grinnell

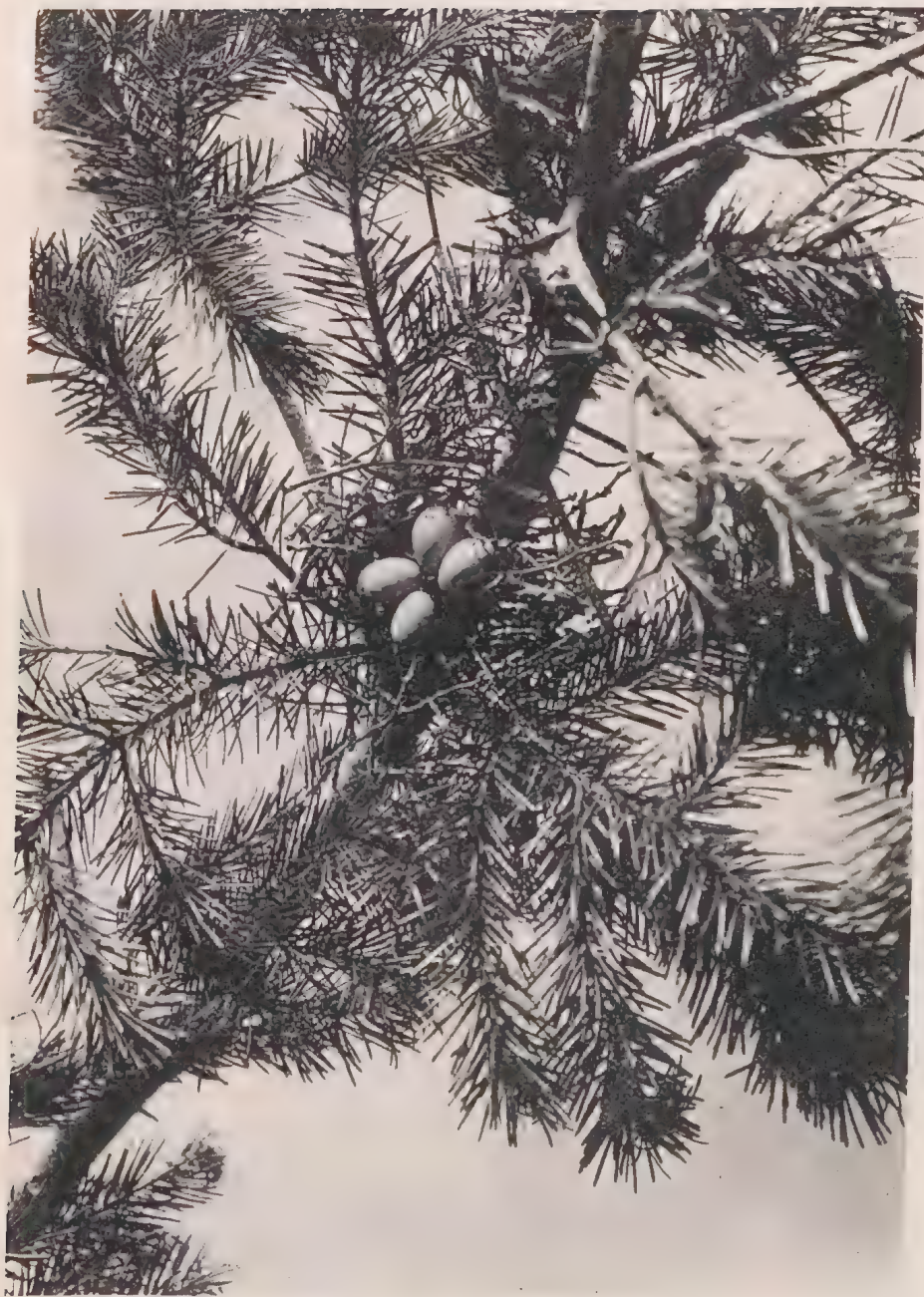
PLATES 63 AND 75

DESCRIPTION.—*Male*: Length (skins), about 6.7-7.3 inches, wing about 4.2-4.6. *Female*: Length (skins), about 6.5-7.3 inches, wing 4.1-4.4. *Adult male*: Forehead and line over eye yellow, crown, wings, and tail black, wings with large white patches; rest of upperparts grading from olive on hind-neck to yellow on rump; underparts greenish yellow to lemon yellow on under wing and tail coverts. Bill greenish yellow. *Adult female*: Brownish mixed with yellow, whitening on belly; throat bordered by dusky, wings and tail black, wings with more white. Bill "apple-green" (Birtwell). *Young*: Like adult female but duller and markings less sharply defined. Bill brown or horn-color.

RANGE.—In summer, southern Rocky Mountain region, at least in Colorado, New Mexico, and central Arizona (Grinnell); in winter recorded from Colorado, mountains of southern Arizona and New Mexico.

STATE RECORDS.—A specimen of Evening Grosbeak was taken on June 3, 1859, at Cantonment Burgwyn, 7,300 feet, but another specimen taken on June 19, 1898, near Colorado Springs, Colorado, has since been made the type of *Heperiphona vespertina warreni*, which inhabits the southern Rocky Mountain region. Though widely distributed through the mountains of the State, except locally, at intervals, they are rare. The first eggs obtained in New Mexico were taken in the Sangre de Cristo Mountains a mile above Willis, at about 8,100 feet (Birtwell, 1901, pp. 388-391). Here on June 5, 1901, both males and females were found common and noisy; the first nest was noted on June 20 and the eggs from this nest were taken on June 26, as also those from a neighboring nest. Two days later, in attempting to obtain the eggs from a third nest, Birtwell lost his life. The grosbeaks were apparently breeding in a colony, for there were other pairs present that seemed to be nesting, although their nests were not located. In the summer of 1903, this same place was visited by the Baileys, and at about 8,000 feet the birds were common in flocks on July 19. Later, in August, they were found higher up, on Jack Creek, to 10,200 feet. In the Sacramento Mountains they were seen at Cloudercroft, 9,000 feet, on July 18, 1901, but all the sets of eggs so far reported are from a lower altitude and taken earlier in the season. Eggs have been taken on July 5, 1903, in Estes Park, Colorado; June 5, 1884, Springerville, Arizona; and June 1, 11, 12, 1909, in the Huachuca Mountains, Arizona. It is probable, therefore, that birds seen at high altitudes late in July and August had like many others wandered up after nesting. [Several pairs apparently mated were seen, April 25, 1919, by Ligon in Monument Park west of Chloride, at about 7,800 feet, and others previously, on April 20, about 20 miles southwest, in Black Canyon.] On May 18, 1876, Stephens took specimens on the Gila that would have nested within a few weeks. [From May 30 to June 2, 1925, in the mountains about 15 miles northwest of El Rito, at an altitude of 9,000 feet, Jensen saw "Grosbeaks by the thousands, evidently preparing to nest in that country" (MS). On July 23, 1917, three, apparently adult and young, were seen by Ligon at 8,500 feet on the east slope of Mount Taylor. Two birds were also noted by him, June 24, 1919, about 25 miles southeast of Taos, at about 10,000 feet; and he found them "in considerable numbers," June 21, 1924, in a canyon about 9 miles southeast of Taos, on the Taos-Cimarron highway, apparently nesting. A pair was found by Jensen carrying nesting materials, June 3, 1922, in Santa Fe Canyon at 7,500 feet among Douglas firs. Three pairs were seen, June 3 and 10, 1928, by him, also in Santa Fe Canyon; and on June 10, perhaps four pairs were seen by Jensen, Ligon, and M. W. Talbot, several miles farther down the canyon. On June 17, the upper locality of the two, at about 8,200 or 8,300 feet, was searched by Jensen and Talbot, when a nest was finally located by Talbot, and its set of four eggs secured by Jensen.

About the middle of July, 1928, several grosbeaks, "mostly in pairs," were seen by Jensen in Santa Fe. On August 5, 1928, he estimated several hundreds distributed over the city. They presumably have no regular migration but wander irregularly over the country according to the variations in the food supply.] In different years they were noted by the Baileys, 3 miles south of Pecos on August 25, 1903; a flock at Tierra Amarilla, September 11, and others at Lake La Jara, September 17, 1904; two at the lower edge of the pines in Santa Clara Canyon, August 20, 1906; a few in a yellow pine in the San Mateos, September 21, 1906; a flock of six in the Gallinas Mountains flying south, high overhead, October 11, 1904. [Hundreds, attracted by box elder seeds, stayed in Santa Fe from August 15 to September 20, 1926. After that, though not so numerous, they were still present until November 10 (Ligon).]



THE RARELY SEEN NEST AND EGGS OF THE ROCKY MOUNTAIN EVENING GROSBEEK
Photograph by M. W. Talbot

Evening Grosbeaks, whether the Western or the Rocky Mountain form to be determined by specimens, remain throughout the winter in the mountains of the northern part of the State, and descend at this season at least to Fort Wingate (Shufeldt); Big Rocky Creek in the Gila National Forest (Birdseye); to the Gila River near the Arizona line (Stephens, in Allen, 1879, p. 237); Fort Webster (Henry); Silver City (Hunn); and Fort Thorn (Henry). [A specimen was taken, December 16, 1919, from a flock of four found 25 miles northwest of Silver City. A flock of 12 was seen December 21, 1922, in Silver City, and 100 on February 27, 1923 (Kellogg). Flocks of various numbers were seen almost daily until May 9, 1923, in different parts of town.]

NEST.—(As described by Willard) 35–95 feet from the ground in pine or fir, near the end of a horizontal branch lightly made of twigs, lined with rootlets, and sometimes grass and finer materials. *Eggs*: 3 to 4, green, blotched with pale brown.

FOOD.—Largely wild fruit, as wild cherry, dogwood, snowberry, and serviceberry, and seeds of shrubs and trees as mountain ash, chokecherry, mistletoe, juniper, alder, box elder, ash, maple, and seeds from the cones of various conifers; also small insects, mainly injurious leaf-eaters, chiefly beetles and hairless caterpillars; but also small wasps, ants, bugs, and spiders.

GENERAL HABITS.—When the field worker is traveling through the mountains, the rare Rocky Mountain Evening Grosbeaks are usually seen in small wandering flocks in the tree tops so high overhead that strong field glasses are needed to make out the details of their olive and yellowish green plumage with its enriching black and white trimmings. In various parts of northern New Mexico, late in August and in September, such small wandering flocks have passed over our camps in the yellow pines, the rare quality of their wild, whistled calls identifying them before they disappeared. But at 8,000 feet on the Pecos River we were fortunate enough to find flocks feeding on the ground around roadside springs so delightfully tame that we could come within five or six feet of them. They stayed about for a week and appeared to be eating small insects, which they picked from the surface of the ground or dug up from under roots or stones. Only two females were noted among twenty or thirty males. Four miles above, at Willis, two years previous, Mr. Birtwell found the breeding colony described in his published notes. One of the hungry brooding females, he said, when her mate was singing near by, “with curious, soliciting cries and fluttering wings like a great overgrown nestling . . . followed him about and by the patient bird was regularly fed” (1901a, p. 389).

In the Huachuca Mountains in Arizona, where Mr. Willard found the Grosbeaks building and brooding, he says the powerful beak made the breaking of twigs for the nest seem easy. And when busy feeding, the birds would walk along the branches from cone to cone skillfully extracting the seeds with their great bills.

In Monument Park west of Chloride, where Mr. Ligon found several pairs of the interesting birds, apparently mated in April “their peculiar

call notes could be heard from all parts of the Park, high up in the yellow pine trees." Others were seen in the region about the same time. During the eight years of his acquaintance with the district he had never seen them so common (MS).

At Santa Fe, Mr. Jensen states, in April and May, 1918, a flock of some fifty birds spent about six weeks on the campus of the U. S. Indian School. This was repeated in 1919 and in 1920. But in 1921, only sixteen were seen, staying only three days. In 1922, only a few birds were noted in April and May. In the fall, on a number of occasions, Mr. Jensen has seen quite large flocks on the Pinyon Flats around Santa Fe, feeding on juniper berries (1923b, p.462). In 1926, after the breeding season, the city of Santa Fe was visited by hundreds of the handsome birds, which remained to feed eagerly on the box elder seeds. For over a month, Mr. Ligon writes, they were so numerous in the box elder trees in the yards of residences and in the capitol grounds "that the shells of the winged seed, when the birds were busily feeding, fell like snow and covered the ground underneath the trees" (MS). In the winter of 1922-23, Mr. Jensen says, they were even more abundant. In Santa Fe, in the spring of 1927, thousands of Grosbeaks were seen daily in town, Mr. Jensen writes. They disappeared suddenly about June 8, and a few returned as suddenly about July 18, with young birds, so confirming Mr. Jensen's belief, from long years of observation, that large numbers of birds in a given area nest at the same time, in small colonies.

In the spring of 1928, only a few of these ever erratic wanderers occurring "not where one expects them to be" but "where you find them," were observed in the region of Santa Fe. When they had been found in Santa Fe Canyon at different times for about two weeks, as the nesting period seems short, on June 17, a careful search was made by Mr. Jensen and Mr. Talbot for their nests. Neither nests nor birds were found during the morning's hunt and, disappointed, the men were starting to drive back down the narrow mountain road when, suddenly, "a male Grosbeak flew low over the car, gave one call note and disappeared." With new zeal, the search was taken up again and, as Mr. Talbot says, "with great good luck," he discovered the nest. It was found on a steep timbered slope near the bottom of the canyon, in a Douglas fir about forty feet in height, and was on a horizontal branch an inch in diameter two and a half feet from the trunk and only fifteen feet from the top of the tree.

At first glance, it is hard to realize that the eggs, shown in Mr. Talbot's beautiful photograph, are actually in a nest, for the "small handful of sticks," loosely put together, without lining, is almost transparent. When it was discovered, with the mother brooding the eggs, such a fierce wind was raging that the small sustaining branch, well toward the top of the high fir, was being so "whipped about in all

directions," that it was questionable whether the nest could hold. The weight of the bird and the surrounding upturned twigs with their many stiff needles "which formed a crude basket for the nest," of course, helped, but Mr. Jensen thinks that the desperate mother bird "held on partly by gripping the nest material with her feet." In any case, Mr. Talbot says, she "changed position several times in order to keep facing the shifting wind." Her endurance was sorely tried, for the gale lasted for three hours. Meanwhile, the patient egg collector, Mr. Jensen, waited below until a momentary subsidence came, when he obtained his prize.

That it is a prize will be realized when we remember that few nests of the Rocky Mountain Evening Grosbeak have ever been discovered, and that this is the second record for New Mexico, the first since 1901, during which time Mr. Jensen has searched unavailingly for nests "at intervals during eleven consecutive years."

When the nesting season was over, numbers of Grosbeaks again visited Santa Fe. On August 5, 1928, Mr. Jensen wrote: "The last three days the birds have been very abundant here and from my shop I can all day long hear their chirping and off and on see birds, two or three or four flying from one garden or grove to another. There must be several hundreds in town now, but they are not together in large flocks (MS).

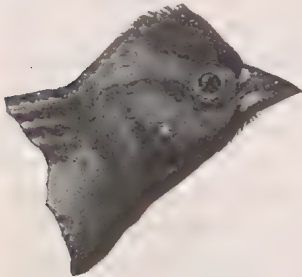
Concerning the abundance of the Grosbeaks in New Mexico, he states that in twelve years he has encountered only three of the enormous flocks, and only three or four times have the birds visited Santa Fe in large numbers. Although, as he expresses it, they "bunch up" and at times are seen in certain localities in great numbers, giving the impression that they are common birds, he considers them really "very rare," and believes that there are no more Grosbeaks in New Mexico than there are wild Turkeys. "Let us suppose, he concludes convincingly, "that we see two to three thousand birds in Santa Fe during the spring and a few in other communities, then let these scatter over the many hundred square miles of the Sangre de Cristo Range in northern New Mexico and Colorado, and we will find very few birds to a square mile" (MS).

Although Mr. Jensen has found, when looking for nests, that the birds "seem to be able to keep quiet and out of sight," when actually encountered, he says they always seem fearless. During his bird banding experiments with them, they have shown this strikingly, the untrapped birds of the flock staying in the trees close by while their comrades were banded, when the process was over, dropping unconcernedly to the ground to go on feeding.

ADDITIONAL LITERATURE.—DUNTON, E. K., *Bird-Lore*, XIX, 310-314, 1917 (winter feeding in Vermont).—LIGON, J. S., *Auk*, XL, 314-316, 1923 (nesting).—LORD, W. R., *Bird-Lore*, 9-11, 1902 (winter feeding in Oregon).—SUSHKIN, P. P., *Auk*, XLII, 256-261, 1925 (anatomy).—WILLARD, F. C., *Condor*, XII, 60-62, 1910.

CASSIN PURPLE FINCH: *Carpodacus cassinii* Baird¹

DESCRIPTION.—*Male*: Length (skins) 5.4–6.3 inches, wing 3.5–3.8, tail 2.3–2.7, bill .5. *Female*: Length (skins) 5.5–6 inches, wing 3.4–3.6, bill .5. Tail much shorter than wing, deeply emarginate. *Adult male*: Head with *squarish crimson crown patch* (brighter in summer) in striking contrast to rest of upperparts; *back*



From Handbook (Fuerter)

FIG. 117. Cassin Purple Finch.

and scapulars dull pinkish brown sharply streaked with dark brown, rump dull rose-pink; wings and tail dusky, wings with reddish edgings; underparts pale pink fading to unstreaked white on belly; under tail coverts usually conspicuously streaked with dusky. *Adult female*: Upperparts olive-grayish, conspicuously streaked with dusky; underparts white, or whitish, conspicuously streaked with dusky except on belly. *Immature male*: For the first year of its life, apparently, the male Cassin Finch is indistinguishable from the female; but having once assumed the pink plumage of maturity it retains it, the only further color changes being due to wear, which makes the adult male appear to be brighter in summer (Chapman).

COMPARISONS.—The adult male Cassin Purple Finch may be distinguished from the House Finch by its squarish crimson crown patch, less conspicuously streaked underparts, and larger size; the female Cassin, by its conspicuously streaked upperparts, darker and much more distinctly streaked underparts. (Pl. 76.)

RANGE.—Breeds in Boreal Zones of mountains from southern British Columbia, western Montana, and northeastern Wyoming south to northern New Mexico, central Arizona, and northern Lower California; winters from southern British Columbia, Colorado, central California and Arizona south over Mexican plateau to Mount Orizaba, San Luis Potosi, and Valley of Mexico.

STATE RECORDS.—Much yet needs to be learned about the limits of the breeding range of the Cassin Purple Finch in New Mexico. No actual nests have been recorded, but a few birds were seen May 6, 1901, at Albuquerque (Birtwell); a single bird was taken May 24, 1859, at Camp Burgwyn (Anderson); and two pairs were seen at Willis May 29, 1901 (Birtwell). [A male was seen June 9, 1918, at Lake Burford (Wetmore); several were seen, June 24, 1919, at Lake Camp 20 miles southeast of Taos, at 10,000 feet, and a male taken was in full breeding condition (Ligon).] A single bird was seen July 15, 1903, at Willis, 7,800 feet (Bailey); and one, July 16, 1898, on the Upper Pecos (Coghill). On August 5, 8, and 14, 1904, four birds in all were seen near Twining at 10,700 feet (Gaut).

When the fall migration was well under way, the species became common. In October it was quite numerous in the Manzano Mountains (Gaut), and one was taken October 23, 1906, at 11,000 feet on the top of White Water Baldy in the Mogollon Mountains (Bailey). Some individuals remain late in the fall. One was taken at Albuquerque November 15, 1853 (Kennerly); and it was noted near Zuni November 20, 1873 (Henshaw). During migration the birds descend into the valley and have been taken as low as Fort Thorn, 4,000 feet (Henry). A few probably remain in the State all winter, as one was taken February 19, 1904, at Cieneguilla 6,500 feet (Surber), where it later became common in the spring migration.

¹ It is interesting to recall that this species was named after Cassin at his special request. On a memorandum of proposed names submitted by Professor Baird to John Cassin prior to publication of the description of some new species of birds, Cassin wrote: "Greatest bird in the lot—call it *cassinii*" (Auk, XLV, 76, footnote, 1928). In accordance with this request Professor Baird stated in the original description: "This species is named in honor of Mr. John Cassin, of the Academy of Natural Sciences of Philadelphia" (Proc. Acad. Nat. Sci. Philadelphia, 1854, p. 119).

In the spring it was taken at Camp Burgwyn, March 14, 1859 (Anderson); at Gallinas Springs, April 3, 1895 (Herrick); at Rinconada, 5,600 feet on April 16, 1904 (Surber); and it was noted at Fort Bayard, April 7, 1908 (Rockhill).—W. W. COOKE.

NEST.—On a horizontal branch, near the top of a young conifer; made externally of twigs and weed stems, and internally of rootlets and grasses, lined with shreds of bark and sometimes sheep's wool. *Eggs*: 2 to 5, greenish blue marked chiefly around the larger end, sometimes finely spotted and lined with brown and black, at others spotted and blotched with pale lavender and a few bold punctuations of bistre.

GENERAL HABITS.—The Cassin Purple Finch is a larger, woodland relative of the more familiar House Finch, and its bright, rich song is heard with pleasure in the forested mountains. One was heard by Doctor Wetmore near Lake Burford singing in the top of a tall pine on a high hill. The young males, in the dull plumage of the first winter, Mr. Ridgway and Dr. W. P. Taylor both have found, "sing almost if not quite so vigorously and sweetly as those in the adult livery." Doctor Taylor has seen them giving their impassioned flight song (1912, p. 387).

In the San Bernardino Mountains in California, Doctor Grinnell has found small companies of males—"bachelor parties"—going about together all through June and July, and he raises the question as to whether more males than females had come to maturity (1908, p. 89).

An instance of the destruction of nests by hailstorms has been reported by Mr. F. S. Hanford. A mother Cassin Finch, he writes, "continued to feed her young in a nest high up in a hemlock during a few hours of rain; at the first cracking downpour of the hail, the nestlings were silenced and the parent was seen no more" (1913, p. 137).

During the month of October, 1904, when Mr. Gaut found the Cassins quite numerous in the Manzano Mountains, they stayed most of the time in the spruce timber, usually in company with Crossbills. During the middle of the day flocks could always be seen around the springs on the slopes of the mountains. Seeds of the yellow pine were found in the crop of one secured (MS). In the Yellowstone the Finches have been found eating rock salt spread on the ground for deer. In November, 1874, Mr. Henshaw saw large flocks at the salt lakes south of Zuni, the cedar-clad hills attracting them and perhaps detaining them through the winter, the salt, doubtless, adding zest to their diet (1875, pp. 240-241).

HOUSE FINCH: *Carpodacus mexicanus frontalis* (Say)

PLATE 76

DESCRIPTION.—*Male*: Length (skins) 4.8-6.1 inches, wing 3-3.3, tail 2.1-2.6, bill .4-.5. *Female*: Length (skins) 5-5.6 inches, wing 2.8-3, tail 2-2.4, bill .4. Tail not decidedly shorter than wing, nearly even. *Adult male*: Forehead, line

over eye, and rump rose-pink, orange-red, or scarlet;¹ rest of upperparts brownish gray, head and back often tinged with reddish, *back not sharply streaked*, wings and tail dusky, wings with grayish edgings; throat and breast reddish; *belly whitish, sharply and closely streaked with brown*. (Red areas much deeper and brighter in summer than in winter.) *Adult female*: Upperparts grayish brown, indistinctly streaked; underparts white, broadly streaked. *Young*: Similar to female but back more distinctly streaked, underparts more narrowly and less distinctly streaked; wing coverts tipped with buffy.

COMPARISONS.—The sharp uniform streaking of the underparts distinguish the adult male House Finch from the Cassin. (See p. 688.) Individuals suggest dichromatism in varying amounts of yellow.

RANGE.—Upper and Lower Sonoran Zones from Washington, Oregon, Idaho, eastern Wyoming (and east to Plains in western Kansas and middle Texas) south to northern Mexico, and northern half of Lower California. Winters as far north as southern Washington and Colorado.

STATE RECORDS.—When Colonel McCall visited Santa Fe in March, 1850, he was much interested in the House Finch which he found there in abundance and already beginning to nest. He saw young on the wing by the middle or latter part of April and noted that the old birds raised a second and even a third brood, so that some were still sitting on eggs even in August. Thinking these birds were different from those found in Colorado by Say, he gave them the name *familiaris* and to a single pair he saw that seemed to lack the usual red color he gave the name *obscurus*. Both these forms, however, were found to be the same as Say's *frontalis*.

The House Finch is one of the abundant birds of most of New Mexico east to near Colfax, August 28, 1913, and along Red River September 16, 1913 (Kalmbach); Sierra Grande, August 10-22, 1903 (Howell); Montoya, June, 1903 (Bailey); Carlsbad, August 1-14, 1910 (Dearborn); and the Guadalupe Mountains, August 11, 1901 (Bailey). Young in the nest were seen June 15, 1903, at Montoya (Bailey), while some pairs were still engaged in building on June 26. The next year half grown birds were found June 2, near Rinconada (Surber). [On June 13, 1916, fresh eggs were found in nests at Chloride (Ligon).] The species ranges from the lowest valleys up to the mesas and the lower mountain slopes. [From May 6 to 10, 1920, it was abundant in the Animas and Burro Mountains, nesting freely (Ligon).] It is a regular and common breeder to 7,000 feet, above which altitude the numbers decrease, but it occurs up to 7,500 feet on the Rio Mimbres, May 11-30, 1906, and 7,200 feet in the Mogollon Mountains, October 31, 1906 (Bailey); 7,800 feet in Hondo Canyon, August 13, 1904 (Gaut); Tres Piedras, 8,000 feet, July 11-19, 1892 (Loring); and even to 9,000 feet at Cloudcroft, July 23-August 1, 1909 (Green).

In general the species is non-migratory, but it is probable that some of the occurrences at the higher altitudes are fall wanderers several hundred feet above where they had nested, although nests have been found to 8,000 feet at Halls Peak (Barber). Late in fall, they were common in Union County, November 5, 1915 (Ligon).

In winter they were very abundant at the south end of the San Mateo Mountains December 7-10, 1915 (Ligon). [On the Rio Grande Bird Reserve they were abundant November 23-December 9, 1916; and on the Carlsbad Bird Reserve, common, in December, 1916 (Willett); at Engle great numbers were seen December 3, 1918 (Ligon).] They winter to 6,500 feet at least and at the localities above this altitude, where they breed but leave temporarily in the winter, they return so

¹Dichromatism in the Genus *Carpodacus*, Richard C. McGregor, Condor, III, 13-14, 1901.



HOUSE FINCH
FEMALE MALE

over eye, and rump rose-pink, orange-red, or scarlet; ¹rest of upperparts brownish gray, head and back often tinged with reddish, *back not sharply streaked*, wings and tail dusky, wings with grayish edgings; throat and breast reddish; *belly whitish, sharply and closely streaked with brown*. (Red areas much deeper and brighter in summer than in winter.) *Adult female*: Upperparts grayish brown, indistinctly streaked; underparts white, broadly streaked. *Young*: Similar to female but back more distinctly streaked, underparts more narrowly and less distinctly streaked; wing coverts tipped with buffy.

COMPARISONS.—The sharp uniform streaking of the underparts distinguish the adult male House Finch from the Cassin. (See p. 688.) Individuals suggest dichromatism in varying amounts of yellow.

RANGE.—Upper and Lower Sonoran Zones from Washington, Oregon, Idaho, eastern Wyoming (and east to Plains in western Kansas and middle Texas) south to northern Mexico, and northern half of Lower California. Winters as far north as southern Washington and Colorado.

STATE RECORDS.—When Colonel McCall visited Santa Fe in March, 1850, he was much interested in the House Finch which he found there in abundance and already beginning to nest. He saw young on the wing by the middle or latter part of April and noted that the old birds raised a second and even a third brood, so that some were still sitting on eggs even in August. Thinking these birds were different from those found in Colorado by Say, he gave them the name *familiaris* and to a single pair he saw that seemed to lack the usual red color he gave the name *obscurus*. Both these forms, however, were found to be the same as Say's *frontalis*.

The House Finch is one of the abundant birds of most of New Mexico east to near Colfax, August 28, 1913, and along Red River September 16, 1913 (Kalmbach); Sierra Grande, August 10–22, 1903 (Howell); Montoya, June, 1903 (Bailey); Carlsbad, August 1–14, 1910 (Dearborn); and the Guadalupe Mountains, August 11, 1901 (Bailey). Young in the nest were seen June 15, 1903, at Montoya (Bailey), while some pairs were still engaged in building on June 26. The next year half grown birds were found June 2, near Rinconada (Surber). [On June 13, 1916, fresh eggs were found in nests at Chloride (Ligon).] The species ranges from the lowest valleys up to the mesas and the lower mountain slopes. [From May 6 to 10, 1920, it was abundant in the Animas and Burro Mountains, nesting freely (Ligon).] It is a regular and common breeder to 7,000 feet, above which altitude the numbers decrease, but it occurs up to 7,500 feet on the Rio Mimbres, May 11–30, 1906, and 7,200 feet in the Mogollon Mountains, October 31, 1906 (Bailey); 7,800 feet in Hondo Canyon, August 13, 1904 (Gaut); Tres Piedras, 8,000 feet, July 11–19, 1892 (Loring); and even to 9,000 feet at Cloudercroft, July 23–August 1, 1909 (Green).

In general the species is non-migratory, but it is probable that some of the occurrences at the higher altitudes are fall wanderers several hundred feet above where they had nested, although nests have been found to 8,000 feet at Halls Peak (Barber). Late in fall, they were common in Union County, November 5, 1915 (Ligon).

In winter they were very abundant at the south end of the San Mateo Mountains December 7–10, 1915 (Ligon). [On the Rio Grande Bird Reserve they were abundant November 23–December 9, 1916; and on the Carlsbad Bird Reserve, common, in December, 1916 (Willett); at Engle great numbers were seen December 3, 1918 (Ligon).] They winter to 6,500 feet at least and at the localities above this altitude, where they breed but leave temporarily in the winter, they return so

¹ Dichromatism in the Genus *Carpodacus*, Richard C. McGregor, Condor, III, 13–14, 1901.



HOUSE FINCH
FEMALE MALE

early that even at 8,000 feet near Halls Peak they appeared on February 14, 1895 (Barber), and were common by the first of March.—W. W. COOKE.

NEST.—In saltbush, sagebrush, mountain mahogany, cane cactus, on branches and in cavities in trees in the open, often in nooks and crannies about buildings and even in bird boxes; shallow, cup shaped, woven largely of dried grass stems and plant fibers, and also, according to location, leaves, rootlets, twigs, hair, string, and wool. Eggs: 3 to 6, bluish white or pale greenish blue, dotted, blotched, and lined chiefly around the larger end, with black or brown.

FOOD.—Vegetable, 97.56 per cent; animal, 2.44 per cent. The animal is mainly plant lice, but alfalfa weevils are also eaten; the vegetable food consists of grain, fruit, and weed seeds. The grain is negligible—less than one-fourth of 1 per cent—and fruit is only 10 per cent for the year, while weed seed amounts to 86 per cent for the year. Mistletoe berries are also eaten. In a fruit country the earliest varieties are the ones most affected and in small orchards sometimes the whole crop is destroyed, but in large orchards the damage is not perceptible, while the destruction of weed seed including sunflower, dandelion, and Russian thistle seed is a material benefit. Where appreciable damage is done to fruit, mulberry trees and serviceberry bushes planted inside the orchards and around their edges might afford protection.

GENERAL HABITS.—The pretty, pink-breasted House Finch, depicted by Major Brooks as singing cheerily over a house top, is well named, for it is not only a friendly little songster, sure of its welcome, but also a thirsty one, ready to appreciate drinking and bathing facilities offered at houses. A simple bowl of water or "an old Indian mortar under a dripping faucet" will keep it comfortable and attract many other thirsty little neighbors, whose social relations and individual habits will afford much amusement and enjoyment to the lookers-on. The delights of "a garden well supplied with water in a dry country" have been entertainingly suggested by the bird lover, Mr. Joseph Mailliard, who turned a dreary convalescence into a period of special privilege by calling his small neighbors around him (1906, pp. 45–50). But away from towns and villages, houses are not always conveniently at hand, and the traveler over long uninhabited stretches, unless supplied with a water barrel, must keep a sharp lookout for water or make a dry camp. Then the sight of one of the pink-breasted House Finches is a welcome one, for, as Mr. Bailey has said, it is "one of the best guides to springs and water holes in this arid region." In the canyons, near the Carlsbad caves, he found that its nests among the dry leaves of tall yuccas or inside old Oriole nests were generally an indication of springs or rainwater holes in the rocks (1928a, p. 155).

Between the Staked Plains and the Canadian River, in June, 1903, the bright songs often greeted us along the way and the nests were frequently seen in the thorny bushes of the cane cactus (*Opuntia arborescens*). One was in a blooming cactus whose beautiful big magenta flowers toned well with the pretty bird's own rosy throat. In another nest, wool was conspicuous in the lining. Still another of

the nests was being made of some green substance that matched the color of the cactus, though it would soon turn brown. In a different locality, a handsome male was seen, in lieu of wool, picking up bits of cotton that had fallen from the cottonwoods. At Rinconada on June 2, 1904, when Mr. Bailey found a half-grown House Finch, presumably second nests were being built, for two-thirds of the nests found by Mr. Ligon on June 13, 1916, near Chloride, had just been vacated by the young birds, and were being reoccupied by the parents, new clutches of eggs being laid.

An abundant resident at Mesilla Park, the House Finch was described by Professor Merrill as "cheery and of pleasant song, with none of the objectionable qualities of the English Sparrow. One pair" he said, "nests regularly in a native clematis over a window at my house. Although it chooses extremely varied nesting sites, it does not clutter up buildings as does the English Sparrow. It eats a little fruit and many insects. On the lower mesa, in company with the white-crowned Gambel Sparrow, it nips off young alfalfa that is newly starting as well as garden truck unless screened. This is in early spring when fresh vegetation is still a rare delicacy on the bill of fare" (MS).

Although in some instances, especially in fruit growing sections, it may be important to control the abundance of the House Finch, in the towns and cities his presence is greatly to be desired. With his bright, happy disposition, his soft rosy plumage, and his sweet musical voice, which he keeps in practice throughout the year, he is all that the English Sparrow is not—a most delightful, cheering little comrade to whom all doors should be open. So readily does he respond to hospitality that by providing bird boxes for him to nest in, drinking and bathing pans for daily use, and winter feeding tables for a possible time of need, he may not only be kept about all the year around, but, by means of observation mirrors, he may be photographed and studied at close range.

An elaborate and extremely interesting study of the House Finch has been made in this way by Dr. W. H. Bergtold in Denver, who explains that "by attracting the birds to one's windows, one comes so closely in touch with them that opportunities for detailed study are unsurpassed, while the bird's abundance and fearlessness give one the most intimate acquaintance possible. Furthermore, the varied calls and notes of both sexes are of exceeding interest, heard to great advantage in this way." A large variety of subjects were studied by Doctor Bergtold, including the character and season of song of both sexes, for "both sexes sing, though the female's attempts are modest and infrequent"; the food of old and young ("the nestlings were, whenever possible, fed as soon as hatched and thereafter on dandelion seeds"); variation in plumage and disposition (some females were so

tame they would allow themselves to be examined with a mirror when sitting and others in cold weather came in to perch on the steam radiator next to the window sill); mating (the birds were apparently permanently mated, as they came at all times of year to the feeding and drinking dishes in pairs); nests and nesting (nests being found about electric arc street lights and in broken globes, and "emergency nests" noted, made in a day); eggs (fourteen days was the average length of incubation); feather development and growth, nestlings and nest habits, development and individuality, first notes, first flights, variation in color pattern, and other subjects. Special detailed studies were also made of weights of nestlings, parasites, injuries, mortality, and the English Sparrow *versus* the House Finch. The English Sparrow who fights for every inch of ground is shown to be so much superior to the House Finch in the biologic struggle that the intelligent help of man is needed to turn the balance to prevent the "retardation of the spread of a native species whose help to the community as a weed destroyer is of far greater value than is any benefit accruing from the English Sparrow as a scavenger, or through its habit of feeding its nestlings partly on animal food" (1913, pp. 40-73).

The songs of the House Finch have been described by the Swenks, who studied them carefully during a winter in Tucson (from October 20 to April 27), watching the seasonal changes and putting down the most striking songs in musical notation. On their arrival on October 20, their account reads, "these Finches were plentiful and conspicuous everywhere about the house. About 6:20 each morning they began to twitter in their sleeping places in the woodbine vines just outside of our east window. By 7 o'clock they were in full song, and from then on they continued singing lustily all the morning, especially around 10:00 a. m. when their songs were at the loudest. Early in November we noticed that they were gradually singing less frequently and less loudly; in fact, it seemed that their numbers about the house were becoming fewer. This period of diminished vocal effort extended from about November 5 to Christmas. Toward the end of December the desultory songs became more frequent, and continued gradually to increase in frequency during January, so that by early February the birds were again singing as lustily as they were when we arrived in the preceding October. By the time nest building was started, early in March (we saw the first birds carrying nesting material on March 7), the singing of the males was at its height, and continued so through the remainder of our stay.

"The House Finch is a joyous bird, and it expresses its joy in its rollicking, warbling song. The song itself is not long, but it is rapidly repeated many times, producing a long-continued flow of singing. The song has many variations; in fact, but rarely do you hear two songs

that are exactly alike. Different individuals will sing slightly differently, and the same bird will vary his song from time to time, but the song always has the same basic structure, is rather consistently given in 6/8 time, and all of the songs share the same general quality." (1928, pp. 18-19).

ROCKY MOUNTAIN PINE GROSBEAK: *Pinicola enucleator montana* Ridgway

DESCRIPTION.—*Male:* Length (skins) 8-8.5 inches, wing 4.7-4.9, tail 3.7-4, bill .6-.7. *Female:* Length (skins) 8-8.3 inches, wing 4.6-4.7, tail 3.5. Bill short and thick, upper mandible strongly convex, tip hooked; black nasal plumules hiding nostrils; tail long, emarginate. *Adult male:* General color *dark carmine*, brightest on head and rump, *feathers grayish beneath the surface, more or less exposed*, especially on chest; feathers of back with dusky centers, tail and wings dusky with light edgings (sometimes tinged with red), *wings with two white bands* (sometimes tinged with red); sides and posterior underparts gray, under tail coverts broadly margined with white. *Adult female:* General color smoke-gray, bright yellowish olive, tawny-olive, or russet on head and rump, sometimes tinging back and anterior underparts. *Young in juvenal plumage:* Like adult female but less strongly tinged with yellowish, wing markings dull buffy, texture of plumage different. *Immature male:* Like female but head and rump with reddish tone, suggesting approach to plumage of adult male (Chapman).

REMARKS.—The plumage of the male is extremely variable in tint, and the red is continuous only in highly plumaged specimens (Coues).

RANGE.—Breeds on Boreal summits of Rocky Mountains from British Columbia, Alberta, Montana (rarely), and Idaho to New Mexico; winters east of Cascades in British Columbia (probably), and in Montana and Colorado.

STATE RECORDS.—The Rocky Mountain Pine Grosbeak finds its most southern extension in the mountains of northern New Mexico. Here it was noted July 23, 1903, at 11,000 feet, below Pecos Baldy; it was seen again on August 15 at 11,600 feet; and on August 14, a family party was found at 12,000 feet near the Truchas Lakes at the head of the Pecos River. The next year, in the Taos Mountains, it was noted August 5-6, at 10,700 feet; and in the Culebra Mountains was collected August 20, at 11,200 feet (Bailey).

Information is lacking as to the exact limits of the actual breeding range of the species. It has been noted in Colorado up to timberline in the summer and down to 9,000 feet in the winter, while in New Mexico it ranges from the upper limit of timber down to 10,000 feet. Since it nests rather early—young out of the nest have been noted in June—it is probable that most of the nests are located at the lower altitudes, 10,000-10,500 feet, and that the birds move upward as soon as the young are fully fledged.

Two of the most southern localities in North America for any subspecies are the Jemez Mountains, where one of the Rocky Mountain birds was seen August 29, 1906, at 10,000 feet, near the head of Santa Clara Canyon (Bailey); and Kingston, where two were taken November 12, 1904 (Metcalf). The center of abundance in New Mexico seems to be in the upper part of the Red River Valley and about Twining. This subspecies is probably largely non-migratory except for a slight vertical movement. [On June 27, 1922, a male and female were seen by Jensen in a large spruce at 12,000 feet on Lake Peak in the Sangre de Cristos. On June 20, 1924, several were seen by Ligon at about 10,500 feet on Red River, northeast of Wheeler Peak and one was taken. They were doubtless breeders, as only males

were observed and they were singing from the tops of high conifers. In 1926, Ligon found a few of the birds above 10,000 feet in the Sangre de Cristos—on August 3, two at the head of the Pecos, near Pecos Baldy; on November 19, a few on Gold Hill, and on November 29, one near Costilla Creek; also in Taos County. With the exception of a pair collected southwest of Cimarron some years previous, these are the only ones met with by Ligon in his extended field experience.]—W. W. COOKE.

NEST.—From 7 to 30 feet from the ground in coniferous trees; made rather compactly, with a framework of small twigs enclosing the nest proper, which is composed of coarse weeds and straws lined with a fine wiry weed. *Eggs*: Usually 3, greenish blue, irregularly spotted and blotched with brown and black, with lilac shell spots.

FOOD.—Largely coniferous buds and wild fruit, but also weed seed and a little animal matter, including cocoons and caterpillars, grasshoppers, ants, and spiders.

GENERAL HABITS.—The large pink or red and gray Rocky Mountain Pine Grosbeaks were occasionally met with in the spruce and fir timber of the Upper Pecos and in the Taos Mountains, and several specimens collected showed the character of their food. One young one had its crop and gizzard stuffed full of small white oval seeds, while an adult's stomach contained the same seeds with the addition of a few spruce needles, a spruce flower, and a small green caterpillar. The throat of another adult had the skin actually puffed out with small green buds and some insects, as if ready for regurgitation. The gizzard held the same seeds and also, apparently, the same insects. Still another had its gizzard full of seeds and insects.

The pair taken in the Culebra Mountains had been feeding on the ground and both crops and gizzards were filled mainly with sprouting seeds of a small legume, with the addition of some smaller seeds.

The Pine Grosbeaks of whatever form are among the most attractive birds of high altitudes, their large size, soft coloration, musical songs, sometimes heard around camps, and their gentle and often trustful ways, combining to endear them to the field worker.

ADDITIONAL LITERATURE.—HERRICK, F. H., *Home Life of Wild Birds*, 135-136, 1901.—RAY, M. S., *Condor*, XIV, 157-187, 1912 (California Pine Grosbeak).—TREGANZA, EDWARD and A. O., *Condor*, XV, 106-110, 1913.

GRAY-CROWNED ROSY FINCH: *Leucosticte tephrocotis tephrocotis* Swainson

DESCRIPTION.—*Male*: Length (skins) 5.7-6.8 inches, wing 4-4.4, tail 2.4-2.8, bill .4-.5. *Female*: Length (skins) 5.6-6.5, wing 3.8-4.1, tail 2.4-2.8, bill .4-.6. Tail emarginate, basal tufts white. *Adult male in summer*: Forehead and part of crown black bordered by ash-gray band, not descending below level of eyes; rest of head and body mainly reddish brown, feathers of rump and upper and under tail coverts tipped with pink; wings and tail dusky with pinkish and sometimes partly scarlet edgings, wing coverts tipped with pink; bill black. *Adult male in winter*: Similar to summer male but back and scapulars with lighter brown edgings, feathers of breast with narrow, pale margins, the pink markings softer, and the bill yellowish

with dusky tip. *Adult female*: Similar to adult male and with same seasonal variation, but averaging paler and duller.

COMPARISON.—Of the four forms of Rosy Finch that have been found in New Mexico, the summer adults can be distinguished by the colors of the head. The



From Handbook
(Fuertes)

FIG. 118. Gray-crowned
Rosy Finch

Brown-capped (see p. 698) is without distinct, clear gray markings; the *Hepburn* (see p. 697) has both cheeks and back of head gray; the *Gray-crowned* and *Black* are without gray on the cheeks, the cheeks in the *Gray-crowned* being reddish brown like the body, and in the *Black* (see p. 697), brownish black like most of the body.

RANGE.—Breeds in Alpine Zone in mountains of east-central Alaska, west-central Yukon, British Columbia, and western Alberta; in winter and in migration from Great Slave Lake, Saskatchewan plains, and Manitoba south to western Nebraska, New Mexico, Colorado, and Utah.

STATE RECORDS.—An adult male *Gray-crowned Leucosticte* was taken by Ligon on November 11, 1919, 15 miles southwest of Cimarron, at an altitude of 9,000 feet.

NEST.—In crevices between rocks, on the ground, made of dry grass stems, roots, and fine bark, lined with fine grass stems and a few feathers. *Eggs*: 4, white, unmarked.

GENERAL HABITS.—In climbing the mountains in their territory, the rosy finches, pipits, and ptarmigan are the three birds eagerly looked for on the heights. Among the rock piles of passes and summits, where marmots and conies live in niches protected from the wind, the hardy rosy finches find shelter for themselves and their young, and by listening for loud raucous calls and watching for windblown figures around the peaks, you may be fortunate enough to catch sight of one with its distinctive, charming touches of rose color.

In Glacier Park we had the good fortune to find a pair flying back and forth to their young from the first dwarf spruces to a ridge above Piegan Pass, and later found a brood on a warm south slope where pipits were also feeding young and an old ptarmigan was leading around a brood. Busily hunting for tiny seeds and small insects, the *Gray-crowns* raised their caps so often that the gray border made a good flag for interested followers (1918, pp. 173–174). They were also seen at a distance, hunting for food on the face of a broad glacier.

Although the cold and storms of their chosen home make them live carefully in summer, it is in winter that their wise adaptation to circumstances is best seen. The one that Mr. Ligon secured near Cimarron, demonstrated this knowledge of safe hiding places. At the time he was returning from a mountain lion hunt in the Sangre de Cristo Mountains, at the beginning of winter, when there was a little snow on the ground and the wind was blowing a hurricane; but in a protected prong of the Agua Fria Canyon, he discovered three

Gray-crowned Rosy Finches quietly hopping around feeding on the frozen ground.

HEPBURN ROSY FINCH: *Leucosticte tephrocotis littoralis* Baird

DESCRIPTION.—*Male:* Length (skins) 6–6.8 inches, wing 4–4.3, tail 2.4–2.7, bill .4–.5. *Female:* Length (skins) 6.1–6.5 inches, wing 3.9–4.1, bill .4–.5. Similar to the Gray-crowned Rosy Finch, but with the *sides of the head partly or wholly gray*. In some cases the entire head and throat, except for the black frontal patch, are light ash-gray.

RANGE.—Mountain districts of northwestern North America, probably breeding above timberline in mountains from the Alaska Peninsula east and south to Washington and Oregon; winters from Kodiak to Vancouver Island, and southeast in mountains to Oregon, Montana, Nevada, Utah, Colorado, and New Mexico.

STATE RECORDS.—From a mixed flock of about 300 leucostictes, which Ligon encountered on November 29, 1926, some 12 miles northwest of Vermejo Park, at about 10,500 feet, he obtained at one shot representatives of three species—the Brown-capped, Hepburn, and Black Rosy Finches.

GENERAL HABITS.—An interesting note comes from Mr. Alfred Bailey, at Juneau, Alaska, where a large flock of the Hepburn Rosy Finches stopped in passing, on April 3. They fed about the Capitol grounds, in the dried grass free from snow, and were so tame that they would allow him to come within six feet of them before taking wing. At Muir Inlet, in Glacier Bay, he found them working back and forth across the moraines and entering crevices high up on the glaciated cliffs (1927, p. 357).

BLACK ROSY FINCH: *Leucosticte atrata* Ridgway

DESCRIPTION.—*Male:* Length (skins) 5.9–6.3 inches, wing 4.2–4.3, tail 2.6–2.7, bill .4–.5. *Female:* Length (skins) 5.6–6.2 inches, wing 3.9–4.2, tail 2.4–2.6, bill .4–.5. *Adult male in summer:* Forehead and part of crown black, sides of crown and entire occiput ash-gray, not descending below level of eyes; rest of head and underparts brownish black or deep clove brown; feathers of sides and abdomen broadly tipped with peach-blossom pink; hind-neck, back, and scapulars dark brown, the feathers with lighter edgings, rump, upper tail coverts and wing coverts peach-blossom pink, the feathers gray or dusky basally. *Adult male in winter:* Similar to summer male but brownish edgings on back and scapulars broader and more distinct, feathers of breast margined with buffy, the pink markings softer and the bill yellowish, tipped with dusky. *Adult female:* Much duller than male, underparts brown, the back more brownish and the pink paler, less extensive, largely replaced by white, especially on wings. *Immature male:* Similar to adult male but pink markings paler, largely replaced on wings by broad tips and edgings of buffy white. *Immature female:* Duller and browner than adult female, with pink markings more extensively replaced by whitish and pale buffy, feathers of back, scapulars, and breast margined with buffy.

RANGE.—Northern Rocky Mountains, and probably other ranges; breeding in Idaho (probably Montana), and Utah; wintering to southeastern Wyoming, Arizona, southern Utah, Colorado, and New Mexico. Recorded from California.

STATE RECORDS.—The Black *Leucosticte* taken November 29, 1926, in Colfax County, by Ligon, from a mixed flock of about 300 leucostictes, was a young male in first fall plumage. (See Hepburn Rosy Finch, State Records.)

BROWN-CAPPED ROSY FINCH: *Leucosticte australis* Ridgway

DESCRIPTION.—*Male:* Length (skins) 5.7–6.5 inches, wing 4–4.4, tail 2.4–2.9, bill 4–5. *Female:* Length (skins) 5.6–6.1 inches, wing 3.9–4.2, tail 2.4–2.7, bill 4–5. *Adult male in summer:*¹ *Top of head dark grayish brown, becoming blackish on forehead, rest of head and fore parts of body cinnamon or russet-brown, often flecked with bright red below; hind neck, back, and scapulars similar but duller, with dusky shaft-streaks, feathers of rump and upper tail coverts broadly and abruptly tipped with peach-blossom pink, grayish brown underneath; wings and tail dusky, with pinkish edgings, the wing coverts broadly edged with peach-blossom pink, sometimes almost scarlet in midsummer; sides, flanks, and belly mostly carmine-pink, the feathers grayish below the surface; under tail coverts dusky centrally, broadly edged with pink and white. Adult male in winter:* Similar to summer male but forehead and crown with grayish brown feather edgings, sides and back of head gray with dusky feather centers, back and scapulars with buffy brown feather margins, anterior underparts with buffy margins, and pink areas softer, more rose pink; bill yellowish instead of black, tipped with dusky. *Immature male:* Like adult male but greater wing coverts edged with buffy in winter or dull whitish in summer. *Adult female:* With same seasonal changes as adult male, but much duller—underparts wood-brown, upperparts grayish brown, and pink markings indistinct. *Young:* Plain grayish buffy brown, paler on posterior underparts; wing and tail coverts edged with buffy.

RANGE.—Breeds in Alpine Zone of mountains of Colorado and probably northern New Mexico; winters mostly in valleys of Colorado and New Mexico.

STATE RECORDS.—The Brown-capped Rosy Finch for more than 30 years has had a place in the list of New Mexico birds, but the record on which such inclusion was based proves to belong to Colorado. There was no real record for New Mexico until the birds were found July 20–30, 1904, on the crest of the Taos Mountains near Wheeler Peak at over 13,000 feet altitude (Bailey, 1905, p. 317). Several were seen and two collected; they presumably nested not far away. [On November 29, 1926, a mixed flock of 300 leucostictes was seen some twelve miles northwest of Vermejo Park, Colfax County, at about 10,500 feet, and specimens of the Brown-capped and two other species were collected (Ligon).] As the species is not known to occur farther south in winter, the birds probably spend the entire year in these mountains.—W. W. COOKE.

NEST.—(Described by F. C. Lincoln, *Auk*, XXXIII, 41–42, 1916.) In a cavity of a cliff, compactly woven of dry grass and flower stems with a quantity of fine moss, lined with fine grass, a few of the bird's own feathers, and one of the White-tailed Ptarmigan. *Eggs:* 3, white.

GENERAL HABITS.—When we were following the crest of the Taos Mountains near Wheeler Peak, at about 13,500 feet, a bird passed overhead which, from its call, its undulating flight, and notched tail, Mr. Bailey pronounced a Rosy Finch. On our second ascent of the mountains the wind was blowing a gale over the peaks and no birds were seen. But later, on a peak east of Wheeler, at about 13,400 feet, Mr. Bailey heard the chirping of Rosy Finches in a cloud that was enveloping the mountains, and soon about half a dozen of the birds

¹ In very fresh plumage, the pattern of the gray shown in the Gray-capped Rosy Finch is suggested but the feathers are dark brownish gray centrally, edged with lighter brownish gray, giving a scaled effect (Ridgway).

flew out of the cloud and lit on near-by stones. An adult male was collected. Two days afterwards our Taos camp man, Sun-Elk, obtained another adult male at the same place, from a flock of five, the rest circling around and then flying down the ridge. The gizzard of one of those taken was filled with small seeds, with the addition of one small insect, and that of the other was filled with finely ground insects and small seeds, the crop filled with small insects of several different kinds. The color of the flesh was bright red and the fat deep orange.

Although there are only small snowbanks on the highest of these mountains in midsummer, the beautiful Rosy Finches are generally found in the region of large bodies of snow; their favorite resort, as Doctor Rothrock says, being "the edges of snow banks, where they find grass seeds, and also a small black coleopterous insect" (in Henshaw, 1875, p. 250). The large mixed flock of leucostictes, which Mr. Ligon found in Colfax County, "were industriously feeding on each side of a sparsely traveled mountain road, where the snow had partly disappeared" (MS).

The presence of these rare northerners, together with the Bohemian Waxwing and White-tailed Ptarmigan, in New Mexico, is matter for sincere gratulation, and adds new interest to the noble mountains that crown the State.

PINE SISKIN; PINE FINCH: *Spinus pinus pinus* (Wilson)

DESCRIPTION.—*Male:* Length (skins) 4.2–4.8 inches, wing 2.7–3, tail 1.6–1.8, bill .4. *Female:* Length (skins) 4.2–5.1 inches, wing 2.6–3, tail 1.6–1.8, bill .4–.5. *Adults:* Entire head and body streaked with dusky (except on posterior underparts) on grayish or brownish ground above, on whitish below; wings and tail dusky or blackish (wings with two whitish bars), and basal portion of wing and tail quills pale yellow. *Young:* Similar to adults but wing bars buffy and underparts often tinged with sulphur-yellow.

RANGE.—Breeds mainly in Canadian Zone from central Alaska, southern Mackenzie, southern Keewatin, and Quebec south to Nova Scotia (in mountains to North Carolina), northern Michigan, southern New Mexico, and higher mountains of western United States to Sierra Juarez and Sierra San Pedro Martir, Lower California; occurs in winter over most of United States and British Columbia, south to western Mexico; casual in southern Lower California.

STATE RECORDS.—[Apparently the only recorded nest of the Pine Siskin in New Mexico is that found by Jensen's son, June 3, 1920, on the Santa Fe Indian School campus in a box-elder about twelve feet from the ground. It is usually common there during April and May, leaving for the mountains about June 1.] It is very irregular in its movements and likely to be found almost anywhere at any time of the year, but in Colorado its nests have been found principally in the lower foothills or even out on the plains. Later in the season or indeed almost throughout the year it is found high up in the mountains almost to timberline. [It is one of the commonest species in the Sangre de Cristo range, occurring at all altitudes (1919); observed above timberline on Wheeler and other peaks, June 18 and 19, 1924, and found abundant at Mootz Ranch west of Elizabethtown in

June, 1924 (Ligon). A pair was seen, June 26, 1922, near the ranger's cabin on Lake Peak, at 12,000 feet (Jensen).] Apparently no nests have been found above 8,000 feet. The most common nesting month is May and the young are out of the nest in June, hence birds seen in July are not necessarily near their nesting grounds. Not only is the Siskin irregular in its movements, but it has the peculiar habit of



Photograph by Russell Reid

FIG. 119. Pine Siskin
Brooding in her spruce tree nest

going in flocks all the year. When a flock is found, it can be taken for granted that the individuals of that flock are not breeding, but it may easily be that some pairs, lately members of the flock, have separated themselves and are at that particular time engaged in nesting.

With these facts in mind, it may be noted that the May records for New Mexico are May 4, 1908, Fort Bayard (Rockhill); [May 10, 1920, Silver City (Ligon)]; May 22, 1892, Hachita Grande Mountains (Mearns), where there is no probability it was breeding; Silver City, where in the spring of 1884, it was common until May 12, after which no more were seen (Marsh); Willis, where flocks were common from March until May; Albuquerque, where they were seen until May, but not

again until November (Birtwell); and Camp Burgwyn, where one was seen as late as May 26, 1859 (Anderson). [At Lake Burford in 1918 it was noted May 26 and 28, and June 16 (Wetmore).] Another June record comes from the Zuni Mountains, where on June 23, 1909, a small flock was seen at 9,000 feet on Mount Sedgwick (Goldman). Toward the latter part of July, they become more numerous, and the last week of that month in 1903 they were common at 11,000 feet on Pecos Baldy, and on August 17, at 10,400 feet, young were seen calling for the old birds to feed them. During this trip the birds were noted from 7,500 to 11,600 feet (Bailey). The next year, from July 20 to August 2, they were common at 11,400 feet in the Wheeler Peak amphitheater of the Taos Mountains (Bailey). Several flocks were seen July 23–August 1, 1909, at Clouderoft, 9,000 feet (Green). In the Jemez Mountains, in 1906, they were common in the lower part of the Santa Clara Canyon at about 7,000 feet late in August, and here on August 22 an old bird was seen feeding two young (Bailey). At Arroyo Seco it has been found as high as 8,000 feet (Surber), and it undoubtedly occurs much higher.

During September and October it is distributed over the State, the above mentioned places, with the addition of Las Vegas (Batchelder) and the Capitan Mountains (Gaut), representing the most eastern extension of the range in New Mexico.

It remains in the State throughout the winter, and at this season comes down into the valleys even to Fort Thorn at 4,000 feet, though "very abundant, both in the river valley and in the mountains" (Henry, 1859).—W. W. COOKE.

NEST.—Usually in conifers, well built and compact, made variously of dry roots, grass, and leaves, lined with hair; or of fine twigs, bark, moss, rootlets, and plant fibers, lined with fine rootlets, moss, fur, and hair. *Eggs*: Generally 3 or 4, light greenish blue, spotted, blotched, and speckled, chiefly around the larger end, with brown and lavender, usually with a few small black markings.

FOOD.—Mainly seeds of weeds and other wild plants, conifers, birch, and alder; but also weevils, caterpillars, plant lice, and scale insects. Two California stomachs contained 1,900 black olive scales and 300 plant lice (Henshaw). A flock of 100 were seen feeding on saw-fly grubs from oak-leaf galls (Bassett). The evidence is strongly in the Siskin's favor. Buds are occasionally eaten locally, but the vegetable food appears to be largely seeds of weeds and other noncultivated plants. In its destruction of aphids, scale insects, and caterpillars the bird renders such valuable service as to entitle it to high economic rank (Gabrielson).

GENERAL HABITS.—At our Lake Burford camp on a bright morning after a rainy day, we were pleased to find a passing flock of the delightful little streaked Siskins stopping in our cottonwoods, and enjoyed watching them as they bathed in the rain pools and sang and disported themselves as if appreciating the bright sunshine. Such a variety of seeds are eaten by these erratic wanderers that they are found among one set of plants or trees one day and an entirely different set the next. In Santa Clara Canyon, where we found them common, yellow pines were in the bottom and nut pines and junipers on the south slope, and it was on the south juniper slope that an old bird was feeding her two late young, their wings going amusingly like windmill sails at their sides during the process. A week later, in the spruces and poplars of the canyon, one of the Finches was feeding on a yellow composite abundant there at the time.

On the slopes of the Manzano Mountains, Mr. Gaut found them very numerous from an altitude of 7,300 feet clear to the summit of the ridges, when the crops of specimens collected showed that they had been eating yellow pine seeds.

Although the Siskins were seen by us from 7,500 to 11,600 feet in the Pecos Mountains, they were most common at 11,000 feet on Jack Creek, where small bands were singing and flying from the cones of one spruce top to another. On the east slope of the Taos Mountains, they were on the weeds of a pine-and-oak-brush hillside with Juncos, Warblers, Nuthatches, Chickadees, and Bluebirds.

October flocks were seen in Willow Creek Canyon, in the Mogollon Mountains, visiting the cone-laden tops of the spruces and also alders along the creek. When picking out the seeds from the small alder cones, they showed their directive yellow wing patches as they leaned over the cones. One very large flock, of probably a hundred birds, was seen flying back and forth up and down the creek, sometimes going in a compact flock, sometimes straggling out, but probably keeping track of each other by giving their characteristic aeolian call as a "location call," when out of sight. Others were heard on top of a pine ridge at 9,000 feet altitude.

In September in the pine region Mr. Henshaw reported seeing a few of the Siskins mingled with flocks of insectivorous birds, with them spending much time on the ground searching for minute grass and other seeds. "Later, they appeared lower down, and in small flocks, and often with Goldfinches, whose habits correspond closely, frequenting the dead weeds, and especially the sunflowers" (1875, p. 247).

ADDITIONAL LITERATURE.—CARRIGER, H. W., and J. R. PEMBERTON, Condor, IX, 18-19, 1907 (nest).—DAVIS, E. R., Bird-Lore, XXVIII, pp. 381-388, 1926 (at feeding table).

PALE GOLDFINCH: *Astragalinus tristis pallidus* (Mearns)

DESCRIPTION.—*Male*: Length (skins) 4.3-5.1 inches, wing 2.8-3.1, tail 1.7-2, bill .4. *Female*: Length (skins) 4.4-5 inches, wing 2.7-2.9, tail 1.7-2, bill .4. *Adult male in summer*: Canary-yellow with black forehead, tail, crown, and wings, white tail coverts, wing bars, and edgings; bill orange or orange-yellow, tipped with black. *Adult male in winter*: Similar to the summer female but wings and tail blacker, white markings more conspicuous. *Adult female in summer*: Upperparts olive-grayish, tail and wings dusky, light markings of tail and wings broader than in adult male; upper tail coverts grayish or whitish; underparts grayish white, more or less tinged with pale yellow; bill horn color. *Adult female in winter*: Similar to summer female but more tinged with grayish brown, wing and tail markings tinged with buffy. *Young*: Somewhat like winter adults but browner.

RANGE.—Breeds mainly in Transition Zone, on Rocky Mountain plateau from southeastern British Columbia, western Montana, and southwestern Manitoba south to Colorado (?), Arizona (rare), and central Nevada; in winter in Montana, Arizona, and Texas south to Vera Cruz.

STATE RECORDS.—On October 31, 1908, Birdseye saw three Pale Goldfinches at Farmington and collected one of them; a few had been seen the previous year a few miles distant at Shiprock (Gilman). These two records from the north-western corner of New Mexico seem to be all that is known of the species in the State, but as it occurs in Arizona, Texas, and Mexico, it is probably more common in New Mexico than the records would indicate.—W. W. COOKE.

ARKANSAS GOLDFINCH: *Astragalinus psátria psátria* (Say)

PLATE 62

DESCRIPTION.—*Male* (skins): Length 3.8–4.1 inches, wing 2.4–2.6, tail 1.5–1.6, bill .3–.4, tarsus .5. *Female* (skins): Length 3.8–4.1 inches, wing 2.4–2.5, tail 1.4–1.6, bill .3–.4, tarsus .5. *Adult male*: Ear coverts and entire upperparts, including tail and wings, black; tail with most of its feathers extensively white basally; wings with broad white edgings; entire under surface yellow. *Adult female*: Upperparts plain dull olive-green; wings and tail as in male but black duller and white more restricted, sometimes obsolete on tail; underparts light greenish yellow. *Young*: Similar to female, but tinged with buffy, and wing coverts tipped with buff. *Immature male*: Crown black, rest of upperparts grading from olive-green to solid black on ear coverts and back; underparts yellow.

RANGE.—Northern Colorado and New Mexico to central northern Texas and south throughout Mexico except northwestern and extreme southern portions; casual in Wyoming.

STATE RECORDS.—Throughout the lower parts of New Mexico, the Arkansas Goldfinch is one of the common summer birds. It ranges across the State from north to south and breeds east to Folsom, late in August 1903; Sierra Grande, common August 10–22, 1903 (Howell); Cimarron, common on August 29 and along Red River, Colfax County, September 10, 1913 (Kalmbach); Santa Rosa, a few about May 25, 1903; base of the Capitan Mountains, June 13, 1899 (Bailey), and July 18, 1903 (Gaut); valleys of the Sacramento Mountains, and Ruidoso Valley, common September 2–18, 1902 (Hollister); and Guadalupe Mountains, August 2, 1901 (Bailey). [In 1917 and 1918, it occurred in great numbers in the Rio Grande, nesting in the cottonwoods. A half completed nest was found July 11, 1917, in a walnut tree at Chloride; a nest with young about ready to fly August 2, 1917, in Albuquerque; many young just out of nests but following parents, October 16, 1917, in Agua Chiquito and James Canyons, Sacramento Mountains near Mayhill; young in the nest October 22, 1917, at Alamogordo; young in cottonwoods October 7, 1918, at Monticello (Ligon).] It breeds as high as Santa Fe, 7,000 feet (Henshaw); Fort Wingate, 7,000 feet (Coues); and to 7,500 feet at Glorieta; in the fall ascending slightly and occurring at Tierra Amarilla, 7,700 feet, September 11–14, 1904, and occasionally as high as 8,500 feet at Costilla, where it was noted, August 25, 1904 (Bailey). The species seems to be most common at 6,000–7,000 feet and only a few breeding records have been made below 5,000 feet, as at Shiprock, about 5,000 feet (Gilman); Santa Rosa, 4,600 feet (Bailey); and Mesilla 3,800 feet (Merrill). It seems strange that it should not be more common in the lower parts of New Mexico, since it breeds in some of the hottest parts of Mexico.

It usually deserts New Mexico for the winter, and, though most of the birds leave by the end of October, some were still present at Tularosa, November 4–14, 1902 (Gaut), and a flock of about a dozen was seen near Shiprock, November 9, 1908 (Birdseye). A few presumably of this species remained in 1900, to January 30, at Albuquerque (Birtwell), and a few have remained all winter at Mesilla (Merrill).

On the return in the spring, it was seen at Apache, April 26, 1886 (Anthony), and at Santa Fe, May 6, 1903 (Merriam).

The form of this species called by Doctor Coues *Astragalinus psaltria arizonae*, and described from a specimen taken June 28, 1864, at Fort Wingate, proved to be only a color variation of *psaltria*, due to age.—W. W. COOKE.

NEST.—In bushes or trees, a neat cup-shaped structure, of compactly woven plant fibers, lined with down and other soft materials. *Eggs*: Usually 4 or 5, faintly bluish white, normally unmarked.

FOOD.—Largely weed seed.

GENERAL HABITS.—Goldfinches of whatever subspecies are among the most attractive of our familiar birds of the low country, and in New Mexico, after leaving Rosy Finches on the snow-patched peaks of the Sangre de Cristo Mountains and Crossbills in the spruces and firs of their forested slopes, we welcomed the sight of the little wild canaries, as they are sometimes called, which, with leisurely undulating flight and gentle deprecating calls, loitered over the sunflower-dotted grain fields of the Hondo Valley. Once, near Taos, a group of the pretty birds was seen on a cliff rose bush, one of them tweaking out seeds attached to the long-winged carpels. Another time one was seen giving his fluttering flight song.

At Mesilla Park, where Professor Merrill found the Goldfinches nesting in cottonwoods, they are seen throughout the year. At Sierra Grande, in the middle of August, 1903, Mr. Howell found them ranging from the base of the mountain a short distance up into the brushy canyons. At Folsom, where he found them common, they were seen on a pine ridge back of town, and their notes were constantly heard from the willows inside the town.

In Santa Fe, where they are abundant, in 1921 Mr. Jensen found twenty-two pairs nesting on the campus of the Indian School, and he found fresh eggs from June 15 to October 1 (1923b, p. 462).

ADDITIONAL LITERATURE.—DUTCHER, WILLIAM, Educational Leaflet 17, Nat. Assoc. Audubon Soc.—MILLER, O. T., Little Brothers of the Air, 244-258, 1892.

GREEN-BACKED GOLDFINCH: *Astragalinus psaltria hesperophilus* Oberholser

PLATE 62

DESCRIPTION.—*Wing*: 2.4 inches, tail 1.7, bill .3. Similar to the Arkansas Goldfinch, but male in fully adult plumage with ear coverts, sides of neck, nape, back, and rump, olive-green instead of black.

RANGE.—Breeds mainly in Upper Sonoran Zone from southern Oregon and Utah to extreme southwestern New Mexico, Arizona, Sonora, and southern Lower California; winters from central California and southern Arizona to Cape San Lucas.

STATE RECORDS.—The center of abundance of the Green-backed Goldfinch is in California, but it ranges regularly east to Arizona, and was once taken on July 14, 1892, in the San Luis Mountains of extreme southwestern New Mexico (Mearns). It probably breeds in the lower parts of these and the neighboring mountains.

FINCHES, SPARROWS, ETC.: LAWRENCE GOLDFINCH 705

[Birds presumably of this form are rather common on the San Francisco River and its tributaries in summer (Ligon, 1916-1918).]—W. W. COOKE.

NEST.—Similar to that of *A. p. psaltria*.

FOOD.—The little animal food it consumes consists of harmful insects, and practically all its vegetable food is seeds of useless or harmful weeds.

GENERAL HABITS.—In a garden in Santa Barbara where Mr. Mailliard studied the attractions of water in a dry country, while an Anthony Towhee bathed deliberately in one of the bathing bowls, besides a thirsty group of House Finches, "an equally impatient crowd of Green-backed Goldfinches" awaited their turn. They would also wait in line for a chance to "hang upside down on the faucet and let the cooling water fall into their open bills, drop by drop" (1906, pp. 45-46).

In California the Green-back has apparently decreased in numbers with the cultivation of the land, but wherever sunflower patches occur it is still to be found, and during the winter months often associates with House Finches, going about in large flocks. In the Colorado Valley in March Doctor Grinnell found large flocks gathered for the night "in the central portions of dense, mesquite thickets, where, perched from three to four feet above the ground, they were certainly safe from marauders; here they sang volubly in chorus until dusk settled. During the day they were scattered out over the hills feeding on the flower-heads of *Perityle emoryi*" (1914, p. 165). They were also common in palo verde washes.

LAWRENCE GOLDFINCH: *Astragalinus lawrencei* (Cassin)

DESCRIPTION.—*Male*: Length (skins) 3.9-4.7 inches, wing 2.6-2.8, tail 1.8-2, bill .3. *Female*: Length (skins) 4-4.5 inches, wing 2.5-2.6, tail 1.7-1.9, bill .3. *Adult male*: Face, front of crown, and throat black; upperparts brownish gray (the back sometimes tinged with olive-green) changing to yellowish olive-green on rump; tail feathers (except middle pair) with subterminal white patch, wings with coverts and quills partly yellow; sides of head and lateral underparts gray, median underparts yellow fading to white on belly. *Adult female*: Similar to adult male but without black on head, and colors duller with yellow less distinct. *In winter*: Browner above and colors more subdued. *Young*: Similar to adult female but colors still duller, breast gray with no or almost no yellow, and underparts indistinctly streaked; young males with more white in the tail.

RANGE.—Breeds in Sonoran Zones from about latitude 40° in California west of Sierra Nevada south into Lower California; winters irregularly in southern California and Arizona, and recorded from Lower California and western New Mexico.

STATE RECORDS.—From its summer home in California, the Lawrence Goldfinch wanders east during the winter to Arizona, and was once taken, January 20, 1876, at Fort Bayard (Stephens, 1902, p. 17).—W. W. COOKE.

NEST.—Similar to that of the Arkansas but eggs white.

GENERAL HABITS.—In the foothills of the Sierra, Mr. Ridgway found that the black-faced Lawrence Goldfinch was "common among trees by the roadside, and uttered very pleasing and quite peculiar notes" (1877, p. 463).

BENDIRE CROSSBILL: *Lóxia curviróstra béndirei* Ridgway

DESCRIPTION.—*Male*: Length (skins) 5.4–6.3 inches, wing 3.4–3.8, tail 1.8–2.2, bill .6–.7, tarsus .6–.7. *Female*: Length (skins) 5.5–6 inches, wing 3.3–3.6, tail 1.7–2.1, bill .6–.7, tarsus .6–.7. *Tips of bill crossed*, tongue horny, concave at end, wings long, tail short. *Adult male*: Dull red (varying in shade seasonally), brightest on rump, dullest on back and scapulars where the feathers have brownish centers; wings and tail blackish without white markings; middle of belly grayish. *Adult female*: Red of male replaced by olive-gray more or less overlaid by yellowish olive, brightest on rump. *Young in juvenal plumage*: Conspicuously streaked with dusky. *Immature males*: A "widely varying mixture of red and green and yellow, never exactly alike in any two specimens" (Chapman).

RANGE.—Northern and central mountain districts of western United States and British Columbia, from the Cascades and Sierra Nevada to the Rocky Mountains in Colorado and New Mexico; during migration east to eastern Nebraska and Kansas, and west to the coast district of California; casually to northern Lower California.

STATE RECORDS.—At 11,000 feet in the Upper Pecos region during the last of July, 1903, small flocks of Crossbills were very common, and at 11,600 feet at the foot of Pecos Baldy they were occasionally heard flying over. At 8,000 feet on the Pecos they were seen on August 21, and later were heard passing over Coyote Creek and Moreno Valley. They were also heard on both slopes of the Taos Mountains (Bailey).

Four specimens were collected from those seen in the Pecos Mountains, and they resemble more closely the form that breeds in the mountains of Colorado than the Arizona breeding bird. There is, of course, no surety that these birds had nested in New Mexico; indeed the probability is that they were migrants from Colorado. Crossbills presumably of this same form were seen once near Willis in the fall of 1883 (Henshaw), and a flock December 20, 1882, near Las Vegas (Batchelder). In the higher parts of the Guadalupe Mountains birds of undetermined subspecies were noted twice in January, 1915 (Willet). At Aragon, in the Tularosa Range, migration was well under way by September 15 and continuing October 7, 1915 (Ligon).—W. W. COOKE.

NEST.—In coniferous trees, rather flat, made externally of conifer twigs, shreds of soft bark or tree moss, and grass stems; lined with fine rootlets and sometimes horsehair. *Eggs*: Usually 4, pale greenish or bluish green, lightly flecked with lavender and with a wreath of lavender and brown spots around the larger end.

FOOD.—Chiefly seeds of conifers.

GENERAL HABITS.—At our 11,000-foot camp in the Pecos Mountains small flocks of the parti-colored Crossbills, calling *kimp, kimp*, as they came, lit in the tops of the spruces, leaning over to pick out the seeds from the cones with their sharply pointed crossed bills, especially adapted to their work. At such times, Doctor Cooper noted, "the color of the males so closely resembles that of the young spruce cones that it is hard to distinguish them on a tree" (1860, p. 198).

On the west slope of the Taos Mountains a few scattered spruces follow Lucero Creek out to the mesa, and in the last of the line a flock of Crossbills gathered on September 26, 1903, its top, brown with cones, calling them from a distance to a feast.

They are hardy mountaineers, ready to accept the good offices of man on their wanderings. Like Cassin Finches, they are peculiarly fond of salt, taking it wherever they can find it, and, when thirsty in winter, they have been known to wait to have the ice broken for them on watering troughs, cheerfully "singing subdued songs, meanwhile."

Their nesting season begins early. In British Columbia Mr. Munro saw the first nuptial flight on February 19, courtship being over in March. An interesting nest that he found was made largely of black tree moss, its rim being decorated with tufts of the vivid yellow lichen (*Evernia vulpina*), which should have toned well with the colors of the female, as it does with those of the Evening Grosbeak. The inside of the nest was felted with black tree moss and contained a breast feather of a Red-tailed Hawk (1919a, pp. 57-60).

ADDITIONAL LITERATURE.—MILLER, O. T., With the Birds in Maine, 5-10, 1904.—WRIGHT, M. O., Educational Leaflet 35, Nat. Assoc. Audubon Soc.

MEXICAN CROSSBILL: *Lóxia curviróstra stricklandi* Ridgway

PLATE 63

DESCRIPTION.—*Male*: Length (skins) 5.9-6.3 inches, wing 3.7-4, tail 2.1-2.3, bill .7-.9. *Female*: Length (skins) 5.7-6.3 inches, wing 2.4-3.9, tail 1.9-2.1, bill .7-.8. Similar to *L. c. bendirei* but decidedly larger.

RANGE.—Mountains of northern Lower California, Arizona, Colorado (rarely), central New Mexico, and western Texas south to Guatemala.

STATE RECORDS.—The status of the red Crossbills of New Mexico is very unsatisfactory. Apparently neither nests nor birds have been reported during the probable very early breeding season. At Fort Lewis, Colorado, a few miles north of the line, eggs were taken late in January (Morrison), and at Monument, in central Colorado, eggs were found from January to April (Breninger), while to the westward in Arizona young just able to fly were taken, March 7, 1881, in the Chiricahua Mountains (Brewster). Apparently the earliest recorded date for New Mexico is May 10, 1889, when they first appeared near Cooney (Barrell), and became common May 15. This is not far from the Chiricahua Mountains, and these birds may have nested in the vicinity of Cooney or have wandered there after having nested at an earlier date in the Arizona Mountains. [On June 1, 1924, Jensen saw a flock in Santa Fe Canyon—four males and four females. Three others were seen the same day farther up the canyon.] Late in summer and fall specimens were taken, on July 12, 1892, at Tres Piedras, 8,000 feet (Loring); August 13, 1905, in the higher yellow pine and spruce forests of the San Mateo Mountains (Hollister); and October 5-8, 1903, from 7,300 feet to the spruces in the Manzano Mountains (Gaut). [A pair of adults in full plumage was taken from a flock of 8 or 10, November 10, 1925, in the Big Burro Mountains near Tyrone at 7,800 feet (Kellogg).] There is no surety that any of these birds had nested in New Mexico, or if so that they had nested at the altitude where they were found in the fall.

If they did breed in the State it is fair to presume that they nested in the yellow pines, since nests that have been found in other States are almost exclusively in these trees.

These New Mexico records are based on specimens, but in addition, Crossbills of one species or the other have been seen or heard in the Chuska Mountains at 8,300 feet, October 2, 1908 (Birdseye); Santa Clara Canyon, August 23-29, at 8,000 feet; in Willow Creek Canyon, of the Mogollons, October 29, 1906; a few September 21, 1906, in the nut pines of San Mateo Canyon and two days later at Cubero (Bailey); while they were abundant in October, 1907, in the Gila Forest Reserve (Bergtold).—W. W. COOKE.

FOOD.—The crops of specimens taken in the Manzano Mountains by Gaut contained yellow-pine seeds.

TOWHEES, SPARROWS, BUNTINGS, etc.: Subfamily Emberizinae

GREEN-TAILED TOWHEE: *Oberholséria chlorúra* (Audubon)

PLATE 79

DESCRIPTION.—*Male*: Length (skins) 6.2-7 inches, wing 3-3.3, tail 3.1-3.4, bill .5. *Female*: Length (skins) 6.5-7.1 inches, wing 2.8-3.1, tail 2.9-3.3, bill .4-.5. Bill small, conical, wings rather long and pointed, tail long, rounded. *Adults*: Top of head reddish brown, upperparts olive-gray more or less tinged with yellowish olive-green and becoming bright greenish on wings and tail; edge of wing, under wing coverts, and axillars bright yellow, throat with white patch, and sides of head, chest, and body, gray, fading to white on belly. *Young*: Upperparts brown, partly tinged with green, and streaked throughout with dusky; wings and tail like adults, but wing bars brownish buffy; underparts dingy white, chest and sides streaked with dusky.

RANGE.—Breeds in semi-arid Transition Zone in interior plateau region from southeastern Washington (?), eastern Oregon, southwestern Montana, and Colorado south to western Texas, southeastern New Mexico, and southern California; winters from southern California, southern Arizona, and western Texas south to Guanajuato and Cape San Lucas.

STATE RECORDS.—Though common throughout New Mexico during migration, the Green-tailed Towhee is known as a breeder only in a few localities, the larger part of the birds nesting to the northward. A specimen was taken, July 20, 1901, in the Sacramento Mountains near Cloudercroft (Fuertes), which probably represented a breeding bird. The species was common June 25, 1903, at 7,400 feet on Mesa Yegua (Bailey), and was found breeding rarely at Willis, 7,800 feet (Henshaw), but was not noted above 8,000 feet on the Pecos. It breeds in Pueblo Canyon near Taos and is not rare near Tres Piedras (Bailey). [On June 22, 1919, it was common about the Bagley Ranch on the Little Rio Grande, 10 miles south of Taos, at 7,400 feet; also at the south end of Round Mountain at about 9,000 feet (Ligon). It is common in northern Santa Fe County from 7,500 to 9,000 feet, nesting in sagebrush, juniper, and rose bushes. Fresh eggs were found May 20-July 10 (Jensen, 1922).] Eggs were found July 13, 1904, at 7,400 feet near Taos (Bailey), and young in the nest July 16, 1910, in the Pecos National Forest about 15 miles northeast of Santa Fe (Dearborn). [At Lake Burford it was fairly common and a nest with three eggs was found, June 11, 1918 (Wetmore).] It probably breeds also in the Jemez Mountains—though the only available records for these mountains are early in the fall—since it breeds to the southwestward from 7,000 feet at Fort Wingate (Fisher) to at least 8,000 feet on Bear Ridge in the Zuni Mountains (Goldman). [It nests generally above 7,800 feet. Very small young were seen

near Mount Taylor, July 25, 1917. A nest with young was found, June 28, 1920, in the Black Range, 28 miles south of Chloride, at 8,000 feet (Ligon).] A specimen was taken June 24, 1892, on the east side of the San Luis Mountains just south of the New Mexico line (Mearns).

After the breeding season, it ascends not rarely much above its summer home. One was seen, September 4, 1906, in the Jemez Mountains on Santa Clara Peak at 10,000 feet, and another at 10,500 feet (Bailey); one late in September, 1903, at 9,000 feet on Costilla Pass (Howell); one September 10, 1904, at 9,300 feet in the Brazos Canyon, and one August 17, 1904, at 11,000 feet (Bailey). In fall it descends into the lowest valleys, as at Mesilla Park (Merrill), Carlsbad (Bailey), and the valley of the Gila (Goldman). In migration it ranges east to near Koehler Junction (Kalmbach), to Folsom and Sierra Grande (Howell), to Fort Sumner (Gaut), to the Guadalupe Mountains (Hollister), and to Carlsbad (Bailey). It was most common in migration during September and early October; it was seen at State College, September 21, 1915 (Merrill), [and one was noted near Gallup, September 30, 1916 (Ligon)]. After this, its numbers rapidly diminish and the last usually leave in November—November 2, 1889, at Cooney (Barrell); one November 8, 1906, at Cliff (Bailey); a few November 17–21, 1909, near Garfield (Goldman).

At Mesilla Park, Professor Merrill has found it abundant from about October to May, but this seems to be the only winter record for New Mexico.

The first returned to Mesilla Park, March 16, 1903 (Ford); to Carlisle in 1890, on March 21 (Barrell); on the boundary line 60 miles west of the Rio Grande, April 1, 1892 (Mearns); Rinconada, April 25, 1904 (Surber); Las Vegas, May 2, 1902 (Atkins); and State College, May 2, 1915 (Merrill). It was noted on the boundary, 100 miles west of the Rio Grande, until May 3, 1892 (Mearns), and a specimen was taken at Silver City, May 10, 1914 (Kellogg).—W. W. COOKE.

NEST.—On or near the ground in wild currant bushes, mountain snowberry, sagebrush, chaparral or cactus; made of grass and stems, lined with rootlets and sometimes horsehair. *Eggs*: Usually 4, white, pale greenish, or grayish, well spotted with reddish brown.

FOOD.—Weed seeds and insects, including injurious beetles, bugs, and also alfalfa weevils (in Utah 35 per cent) (Kalmbach).

GENERAL HABITS.—The Green-tailed Towhee, or Red Top, as he is sometimes called, finds his food largely by scratching over the ground in Towhee fashion under sagebrush, oak brush, or chaparral. Here his mewing call may often be heard, and glimpses may be caught of him, a glint of green, a rufous cap, and white chin, as he shifts from one part of his thicket to another or pitches down with head lowered and tail widespread. When startled, I have seen him throw his long tail over his back and raise his crown till it glowed red in the sun; then vanish. He also runs over the ground with his tail over his back. When not disturbed he will sing from the top of a juniper or other lookout in plain view. In Hondo Canyon we heard him singing in the oak brush as late as August tenth. At the Carlsbad Cavern, Mr. Bailey occasionally saw him "in the brushy doorway of the great cave." He has also been found by Mr. Ligon in the aspen and oak region, where the mountain sides were covered with wild rose and other bushes.

Near the Pueblo of Taos, where we found a Green-tail brooding eggs on a sagebrush nest overgrown with clematis, at our approach she would drop from the nest and skulk off through the sagebrush so that it was almost impossible to see her. But a mother with young out of the nest, surprised by Doctor Taylor, came running out toward him from a chinquapin thicket dragging her wings and limping, adding to the effect "by uttering a shrill note of pain" (1912, p. 403).

Although usually seen in the sagebrush or chaparral at a distance from houses, the shy Green-tails become tame and friendly when attracted by food. This was shown strikingly by Mr. and Mrs. Eugene Law, who, when banding birds in the mountains in southern California, by throwing out food soon experienced some of the "intimate pleasures of bird banding." "Crumbs and nut meats, which we scattered about," Mr. Law says, "soon began to assemble Green-tailed Towhees.

"The first to appear was a youngster, in juvenal garb but grown, and with it an older bird of the year, already in post-juvenal plumage. As the days passed three adults came along, one of them wearing an old band. All five became competitors for the food which we kept constantly ready for them, the adults dominating the immatures mercilessly.

"All soon learned that a swinging arm meant a tossed crumb, and one or more birds invariably dashed for a thrown crumb, but never apparently tried to catch the morsel on the wing. Their sight is particularly keen and far, and even a crumb held up for inspection was at once detected by the birds from their brush cover some twenty-five feet away, and they were alert to start for the morsel the instant it was thrown. They often snatched the thrown tidbits from among chipmunks (*Eutamias speciosus*), which appeared stupidly unconscious that food had been thrown. The chipmunks soon learned, however, that we were favoring the birds and became openly jealous and chased the birds around. The latter yielded ground but that was all, and we often saw one hopping around comically just in advance of a pursuing chipmunk. Once I saw a towhee stand its ground, with lowered head, and then the chipmunk yielded.

"Quite to our surprise, when we had nuts suspended on strings to test the jumping limit of the chipmunks, adult towhees, never more than one in action at a time, possibly only the same individual at all times, often jumped up and caught at the nut kernel thirteen inches from the ground, and occasionally one hung there by its beak, flopping the body about, ludicrously like a fish just pulled from the water. In no case did we detect the bird actually dislodging the nut. As soon as the adults had tasted English walnut meat they lost their

interest in bread crumbs and seemed to instantly distinguish between the two.

"The adult Towhees never came to our hands for food, but became quite indifferent to our presence and worked freely about the ground in front of our open kitchen; indeed, often about the kitchen floor if we remained quiet. The juvenal, in striking contrast, quickly became friendly and unsuspicious, but rejected nut meat unless finely broken up, and clearly preferred the bread crumbs. These it would come and take from our hands when the crumb was patiently held down to the level of its head, though it never came with reckless abandon. Once on the way to my hand, it paused to snatch a live fly from the floor, and then came on for its crumb. It soon learned, too, to come to the table, at my elbow, and help itself to the litter of crumbs always kept there. The older bird of the year, while slightly less confiding, was much less suspicious than were the adults, whose survival to maturity was no doubt the direct result of serious suspicion of all objects that moved."

After working for a month at the same cabin, the Lawes moved to one some four hundred yards distant, hidden from the old one by a knoll. At first, Mr. Law relates, "we had no Green-tailed Towhee boarders there, but after a few days a banded one appeared and ran toward us in apparent anticipation. Bread crumbs quickly thrown out were pounced upon, and we felt sure "our juvenal" had found us, although this bird had now acquired its full post-juvenal plumage. From then on it was usually nearby.

"An old candy box was now kept liberally filled with crumbs and cracked wheat, usually on a chair just inside the kitchen door, but later on the table.

"We learned to recognize a certain squeak note as a plaint for food. It was uttered when the door was closed and no food available. A bird on the window sill looking in meant 'please open the door,' and in it came as soon as the door did open.

"At 11:05 a. m., on September 20, we trapped this bird to confirm our belief that it was No. 76549. The trap had been set only three minutes. Before 12:00 m., it was back in the food box on the kitchen chair within two feet of Mrs. Law, contentedly gorging itself.

"Except on September 21, when it was absent all day, it remained about until late on September 27. As no other Green-tailed Towhees were seen after that and the species had been rare for two weeks, we assumed that instinct for migration had overcome pleasure of easy food" (1926a, pp. 133-134).

ARCTIC TOWHEE: *Pipilo maculátus árticus* (Swainson)

DESCRIPTION.—*Male*: Length (skins) 6.9–8.3 inches, wing 3.3–3.6, tail 3.6–4.1, bill .5. *Female*: Length (skins) 7.2–8.3 inches, wing 3.1–3.6, tail 3.4–4.1, bill .5. Similar to the Spurred Towhee, but coloration lighter, male with black of back mixed with olive-gray and white markings much more extensive, wings sometimes with a conspicuous white patch, tail corners with more white (white on outer feather 1.3–1.7 inches long); female and young also lighter.



FIG. 120. Arctic Towhee, skin

RANGE.—Breeds in Transition and Upper Sonoran Zones of Great Plains and Rocky Mountain region from southern Alberta and forks of Saskatchewan south to western Nebraska and Wyoming; winters from eastern Colorado and southern Nebraska south to southern Texas, New Mexico (?), and Utah.

STATE RECORDS.—During the winter the Arctic Towhee comes into southeastern Colorado and south into Texas. It is known from Monon, Colorado, only a few miles from the New Mexico line, and is recorded as occurring in the Arkansas Valley as far west as Pueblo. Under these conditions it is almost certain that part of these individuals enter New Mexico during migration or in winter, but as yet apparently the only record is from Las Vegas Hot Springs on December 14, 1882 (Batchelder).—W. W. COOKE.

SPURRED TOWHEE: *Pipilo maculátus montánus* Swarth

DESCRIPTION.—*Male*: Length (skins) 7.1–8.3 inches, wing 3.3–3.6, tail 3.5–4.4, bill .5–.6. *Female*: Length (skins) 7.1–8.1 inches, wing 3.1–3.5, tail 3.4–4.2, bill .5–.6. Bill moderate, conic, wings short and rounded, tail long, graduated, feet large and strong, claws stout and much curved.

Adult male: Foreparts and entire upperparts black, except for grayish rump and white markings on wings and tail corners (white on outside feather 1.1–1.3 inches long); sides deep rufous, belly white, iris red. *Adult female*: Black replaced by dark brown, back obscurely streaked with black, white markings obscured. *Young*: Streaked with black over brownish ground above, buffy below, markings on wings and tail as in adult but restricted on wings; iris first bluish, then hazel, and later dull orange (J. A. Munro).



FIG. 121. Spurred Towhee, skin

RANGE.—Transition and Upper Sonoran Zones from British Columbia and Wyoming, south to Tamaulipas, New Mexico, and Sonora.

STATE RECORDS.—The breeding range of the Spurred Towhee includes the larger part of New Mexico, east to the Guadalupe Mountains (Bailey), [Sacramento Mountains (Ligon, 1916–1918),] the Capitan Mountains (Gaut), Cabra Springs (Bailey), and Sierra Grande (Howell). It was common from July 28 to October 24, 1913, in the foothills near Koehler (Kalmbach), [also noted in the Cimarron region, June, 1924 (Ligon).] West of this line it breeds throughout the State, up to 8,100 feet in the Big Hatchet Mountains (Goldman); [it breeds abundantly around 8,500 feet about Mount Taylor (Ligon, 1916–1918)]; to 7,400 feet near Cabra Springs, and to a little above 8,000 feet on the Pecos; though in general in these mountains of northern New Mexico it is not common above 7,500 feet (Bailey). [It is fairly common in the foothills of northern Santa Fe County. A nest with fresh eggs was found May 31, 1920, 2 miles southeast of Santa Fe (Jensen).] The lower limit of the regular breeding range is only slightly lower, since it nests down

to 6,000 feet at Silver City (Marsh); to 6,200 feet in the Animas Mountains (Goldman); to 7,000 feet at Fort Wingate (Hollister). From this it appears that the principal breeding range is a narrow vertical belt between 6,000 and 8,000 feet, with much the largest part of the individuals breeding between 6,500 and 7,500 feet. It breeds rarely in the hot valleys, where a nest was found in 1913 at Mesilla Park (Merrill). It nests commonly in June, but in 1901 eggs were found at 8,000 feet in the Guadalupe Mountains near the Texas line as late as August 20 (Bailey); eggs were also found July 22, 1913, at Mesilla Park (Merrill); [young out of the nest were seen about Mount Taylor July 25, 1917 (Ligon)].

In fall, the species ranges only slightly above its summer home, to 8,500 feet in the Magdalena Mountains, to 9,000 feet in the Mogollon Mountains above Kingston (Goldman), and to 9,000 feet in the Datil Mountains (Hollister). It has been noted at this season east to Fort Sumner (Gaut).

During winter it descends to the lowest valleys of New Mexico, to Fort Fillmore (Henry), and to Gila (Goldman). In the Guadalupe Mountains it was seen occasionally to 7,000 feet in January, 1915 (Willett), and south of Queen, where one was seen December 31, 1915 (Ligon). It was found rare in December and January in the middle and southern parts of the San Andres Mountains, and on Salinas Peak (Gaut). A specimen was taken December 27, 1914, at Silver City (Kellogg). It remained at least until December as far north as Las Vegas (Batchelder), but it must be rarely that any individuals remain through the entire winter in northern New Mexico.

The return from the lowlands to Cooney (about 6,000 feet) in 1889 was noted on March 28 (Barrell), which is about the date when the first should be expected in the lower parts of northern New Mexico; it was noted April 25, 1900, at Pecos (Birtwell), while at Halls Peak (8,000 feet), near the upper limit of the range, the first was not seen in 1895 until May 5 (Barber).—W. W. COOKE.

NEST.—On the ground or in a bush; made variously of inner bark, leaves, small sticks, and weed stalks lined with dry grass. *Eggs*: 4 or 5, pale greenish or bluish, finely specked with brown and lavender, massed around the larger end.

FOOD.—About one-third animal to two-thirds vegetable matter. The animal includes alfalfa weevils, harmful beetles, ants, wasps, and bees, the black olive scale, grasshoppers, caterpillars, spiders, millipeds, and sow bugs. In the vegetable, fruit amounts to 17.7 per cent (largely wild or waste); grain 4.7 per cent (mostly from stubble fields); mast 15.6 per cent; weed seed 34.6 per cent, including tarweed, ragweed, alfilaria, and rough pigweed, with a preference for thistle and burr seeds.

GENERAL HABITS.—The handsome black Towhee, or chewink, seen singing cheerily with head upraised on a tree overlooking a thicket, or heard scratching among the dead leaves, with whose colors his russet sides harmonize, is one of the characteristic birds you look forward to finding when descending from the conifer-clad mountains to the middle, Transition Zone country. In the warmer parts of New Mexico, where Transition Zone runs high, as in the Guadalupe Mountains, the Spurred Towhee is found on top of the range. Here, at 8,000 feet, a nest was discovered by Mr. Bailey on August 12, 1901. The nest, which contained three fresh eggs, was well located, being sunk in the ground in a clump of bear grass under the protecting branches of a two-foot shin oak. About a week later, near the same altitude, a half grown Towhee with white tail corners was seen.

At Lake Burford, in June, 1918, Doctor Wetmore found the birds common on the slopes and in the gulches, for cover choosing thickets of scrub oak and clumps of wild currant and serviceberry. They were among the commonest birds in the Taos country the second week in July, 1904, singing from the tops of wild plum bushes along the roads, or scratching in the leaves in the mouths of the canyons. In Pueblo Canyon at 7,400 feet, on July 15, an old male was seen feeding a grown young one that was following him about. As late as August 11, the birds were singing in the oak brush on the side of Hondo Valley.

In the Jicarilla Mountains, early in the fall of 1903, Mr. Gaut found them the commonest birds, especially along the gulches and on thinly timbered hillsides. A number of specimens were secured in traps, baited with rolled oats and bread, set for small mammals about fallen logs.

In the "bosques" of small cottonwoods, willows, and tornillos at Mesilla Park, Professor Merrill found the Spurred Towhee sparingly throughout the year. Only rarely did it leave its secluded retreats for the open fields and higher grounds. As he says, whether kicking the leaves vigorously about on the ground, emitting its peculiar *che-enk*, or sitting on the tip top of some tree energetically venting its song, it is characteristically a towhee. Its real song is clear, mellow, and ringing at once; a higher, emphasized note first, followed by a succession of lower notes, ending in a little twist. On July 22, 1913, the Professor found a nest in a willow bush about four feet from the ground. Lying low beside the bush, he watched the female near by flit noiselessly about among the dense growth, while the male scolded volubly, attracting to the scene in a short time a pair of Cooper Tanagers, a California Cuckoo, a male Painted Bunting, a male Black-headed Grosbeak, and a pair of Western Yellow-throats. The latter were nesting near by. All came within a few feet of the visitor and, excepting the Cuckoo, scolded vehemently at his intrusion. The Cuckoo quietly took one look and glided out of sight again. The hub-hub subsided gradually and the female Towhee went back to her brooding again, while the male mounted to a tip top branch and rejoiced in song (MS).

ADDITIONAL LITERATURE.—BADE, E., Bird-Lore, XXI, 342-346, 1919 (bird photography).—MILLER, O. T., Upon the Tree-Tops, 159-160, 180-184, 1897.—PEARSON, T. G., Educational Leaflet 79, Nat. Assoc. Audubon Soc.

CANYON TOWHEE: *Pipilo fuscus mesoleucus* Baird

PLATE 79

DESCRIPTION.—*Male*: Length (skins) 7.6-8.8 inches, wing 3.5-3.9, tail 3.8-4.2, bill .6-.7. *Female*: Length (skins) 7.7-8.7 inches, wing 3.4-3.9, tail 3.7-4.3, bill .6. *Adults*: Top of head light reddish brown, rest of upperparts and sides plain dull

grayish brown; throat pinkish buff, bordered by dusky triangular spots, chest with obsolete patch; median underparts whitish, sides yellowish brown becoming ochraceous-buff on under tail coverts. *Young in juvenal plumage*: Essentially like adults but brown cap not evident, buffy throat patch not so pronounced, and underparts streaked with dusky (Chapman). Upperparts dull grayish brown, indistinctly streaked with darker, wings with pale rufous band and edgings, underparts dull white changing to reddish brown on under tail coverts, breast streaked with blackish; iris pale brown.

RANGE.—Upper Sonoran Zones from west-central and southern Arizona and southern Colorado south to western Texas and northeastern Sonora.

STATE RECORDS.—In the Upper Sonoran Zone of New Mexico, the Canyon Towhee is a common resident of quite general distribution east to the Guadalupe Mountains (Bailey), Sacramento and White Mountains (Hollister), Capitan Mountains (Gaut), Santa Rosa and Montoya (Bailey). Its range includes nearly all of northeastern New Mexico, since it was noted at Las Vegas (Batchelder); along Red River, Colfax County (Kalmbach); and at Apache Canyon, Sierra Grande, Folsom, and Oak Canyon (Howell). [In the Sangre de Cristo Range it is seen rather commonly about the mouths of canyons, where they widen out at the edge of the desert country, generally from about 7,500 feet down (Ligon, 1919). In northern Santa Fe County it is abundant on the pinyon flats (Jensen).] Westward it ranges across the State and has been noted along the Chama River, in Santa Clara Canyon, at San Isidro, Juan Tafoya, Cubero, Acoma, Joseph, and San Francisco Canyon (Bailey). In the mountains it does not ascend much beyond the lower foothills, being common up the Pecos to Glorieta, 7,400 feet (Henshaw); to about the same altitude above the town of Pecos (Bailey); less common to Willis 7,800 feet (Birtwell). In going down from the Sangre de Cristo Mountains we met with it at an altitude of 8,000 feet in Hondo Canyon, but as the young were full grown at this time (August 12, 1904), the nesting site may have been several hundred feet lower (Gaut). About 7,000 feet seems to be its normal upper limit in northern New Mexico, while in the southwestern part it ceased to be common in the Florida, Big Hatchet, and Animas Mountains above 6,000 feet. In these mountains it nested to the base of the foothills at 5,000 feet (Goldman), while at Santa Rosa it nested as low as 4,600 feet (Bailey).

[A nest with newly hatched young was found, April 14, 1918, near Santa Fe, but the usual nesting dates are May 20–July 15 (Jensen).] Eggs were found June 16, 1899, near the base of the Capitan Mountains; a nest June 28, 1894, at Silver City (Fisher); young still being fed at San Pedro, July 9, 1889; and it was noted in the Guadalupe Mountains, August 8, 1901 (Bailey); [near Culberson Ranch, Grant (Hidalgo) County, a nest with one egg was found May 7, 1920; at Chloride, fresh eggs were found in cactus at 6,200 feet, May 28, 1916; and one-half mile west of Chloride, about 6,200 feet, a nest with very small young was found August 9, 1919 (Ligon)].

It is non-migratory except for a small vertical movement, spring and fall, and for a slight spreading out in winter, when it goes east to Fort Sumner (Gaut), descends to Garfield (Goldman) and to Mesilla (Merrill), while at the same time it remains up to about 6,000 feet in the southern San Andres Mountains (Gaut). It was noted to 8,000 feet in Hondo Canyon and a specimen was collected at Gold Camp, January 23, 1903 (Surber). In Union County it was abundant November 5, 1915 (Ligon), and several were seen at Currumpa, January 15, 1894 (Seton); in the Guadalupe Mountains it was common from 4,000–6,500 feet in January, 1915, [fairly common in December, 1916 (Willett)]; and south of Queen, common, December 31, 1915; at the south end of the San Mateo Mountains it was common,

December 7-10, 1915 (Ligon). [On the Rio Grande Bird Reserve (Elephant Butte), it was abundant, November 23-December 9, 1916 (Willett).]—W. W. COOKE.

NEST.—In sagebrush, pinyon pines, junipers, thick bunches of cholla cactus, or between the leaves of yuccas; deep, bulky, loosely made of coarse grasses lined with rootlets or horsehair. *Eggs*: Usually 3, bluish white, or pearl gray, spotted and scrawled with brown and sometimes black, with purple shell markings.

GENERAL HABITS.—The big, fluffy, rufous-crowned Canyon Towhee, Mr. Bailey found common and breeding throughout the juniper belt around the base of the Capitan Mountains in 1899, where a nest built conveniently near a spring, in a bush three or four feet from the ground, had several pieces of old rags worked into its outer wall. The birds were quiet save for their sharp *chirk*, a note of alarm and inquiry.

Near Santa Rosa one came familiarly about our camp, perching in the sunny top of a juniper, with head up and tail hanging, singing even through the quiet noonday hours. The song was loud and rather pleasing though monotonous, one note being repeated seven times, often prefaced by a thin chip and given in a variety of ways that made it seem more interesting. The birds were also frequently seen among the rocks. They were found, September 20, 1903, with the first sagebrush at 7,500 feet on the west slope of Taos Pass. Two were seen about July 15, 1904, near Taos Pueblo, but none in the mountains above. Below, on the sides of Hondo Valley, on August 12, when we found them common and singing, a grown young one was taken whose iris was pale brown and which had the rufous feathers just beginning to come in on its crown. It had been feeding on the slope of the valley where there were fields of ripe wheat, and its stomach contained mainly wheat, but also a few insects, including grasshoppers. An adult taken in the same place had eaten seeds, including wheat, and also a few insects.

Two were seen August 18, 1906, on a fence in Espanola, and fully a dozen were noted by Mr. Gaut October 15, 1904, in the cane cactus (*Opuntia arborescens*) when riding between Abiquiu and Espanola. At times they would follow the side of the road, flying from one *Opuntia* to another for several hundred yards before deciding to let horse and rider pass them. Along adobe and rock walls, rough brushy banks of irrigation ditches, and brush fences they seemed the most numerous.

On the east side of the San Andres Mountains, where Mr. Gaut found them rather common among the rocks on the sides of the canyons, they seemed to enjoy scratching the ground in the Apache plume (*Fallugia paradoxia*) thickets. Pairs usually traveled together. In the Manzano Mountains, late in fall in certain favored spots, they were found usually in pairs or fours. Exposed rocky canyons in the foothills and on the slopes were their principal resorts.

In the brush on the lower slopes of the Big Hatchet Mountains at 5,000–6,500 feet during the middle of July, 1908, Major Goldman found them rather common, and a nest containing three fresh eggs was found about four feet from the ground among the protecting saw-toothed blades of a *Dasyllirion*.

In summer Professor Merrill has found the Canyon Towhee "only in the mountains from about 5,500 to 7,000 feet and not numerous above 6,500 feet." In winter he has seen it "sparsely in the bosque along the river near Mesilla Park with the Spurred Towhee, and in large numbers in canyons in the Organ Mountains up to 6,000 feet." He says, "it nests often in cholla clusters and the young are scratching for themselves by July 1st. The summer note . . . is a plaintive sort of *Cheewp*, softly repeated as the birds scratch among the leaves and grass or are perched in some low bush. In winter a noisy call of three yeeeps is given" (MS).

In the winter of 1884, Mr. Batchelder found the birds at Las Vegas Hot Springs along the river bank, and in a variety of other places. He writes: "Among their resorts were the small cliffs scattered along the river, where they poked about among the masses of fallen rocks at their bases, and in the clefts and gullies by which they were intersected. They were apt to be found, too, about the Mexican villages, where they might be seen perched on the high adobe wall surrounding a courtyard, or exploring the ruins of some deserted house that offered a safe retreat in case of alarm. Perhaps, however, the places where they were most numerous were some small irrigated fields on the outskirts of one of these little villages. Where these fields bordered the river or an irrigating ditch, they were fringed with bushes, chiefly willows, that were a favorite haunt of the Towhees" (1885, p. 237).

At the Carlsbad Cavern, during Mr. Bailey's stay, while the Greentails and Arctic Towhees were seen at a distance, the Canyon Towhees were common and friendly birds around the cave buildings, generally seen picking up crumbs about the dooryards and woodpile, and were quick to come to grain scattered out for the quail. They also came, he tells us, "to my porch and doorstep where I swept out the seeds and rolled oats that the [tamed] kangaroo rats had scattered about my room. When my door was left open, they even ventured in to pick up such food as their bright eyes were quick to see, while watching me with cautiously friendly expression. They are very talkative among themselves, and often uttered little chirps and call-notes seemingly to attract my attention, evidently considering me a harmless and rather interesting and useful addition to the fauna of the cave region" (1928a, p. 156).

ADDITIONAL LITERATURE.—HUNT, RICHARD, *Condor*, XXIV, 193–203, 1922 (musical taste).

ABERT TOWHEE: *Pípilo áberti* Baird

DESCRIPTION.—*Male*: Length (skins) 8.2–9.1 inches, wing 3.5–3.8, tail 4.2–4.7, bill .6. *Female*: Length (skins) 8–8.7 inches, wing 3.4–3.6, tail 4–4.3, bill .6. *Adults*: Lores and chin blackish. Upperparts plain grayish brown, darker on wings and tail, primaries edged with pale brownish gray; lores dusky, chin and throat streaked with blackish, underparts pinkish brown, belly ochraceous buffy; under tail coverts tawny. *Young*: Paler and duller (less pinkish), breast indistinctly streaked.

RANGE.—Lower Sonoran Zone from southeastern California, southern Nevada, and southwestern Utah to southwestern New Mexico, southern and western Arizona, Sonora, and, at least in winter, to northern Lower California.

STATE RECORDS.—The type specimen of the Abert Towhee came from New Mexico, but without the mention of any exact locality. It was taken in 1846 by Abert on a trip during which he went west to Laguna and south to Valverde, a small settlement on the Rio Grande about 20 miles south of Socorro. It is almost certain that the type specimen was taken at Valverde, as this is the only place where his diary mentions making up specimens of birds. He was here from November 15 to December 15.

Wherever he obtained his bird, it was a strange capture, for this species has not been known since Abert's time in any part of New Mexico that he visited. It occurs now only in a restricted district in the southwestern part of the State in the valley of the Gila, where it has been noted at Redrock (Goldman), Cliff (Bailey), and Gila (Goldman). It was fairly common here during October and November, but kept in the lower parts of the valley below 5,000 feet. [It was common, May 15, 1928, at Redrock, and four nests with eggs were found (Ligon)]. Many years ago it was found during February at Old Fort West near Cliff (Stephens). It is non-migratory.—W. W. COOKE.

NEST.—Rarely more than 5 feet from the ground, in willow thickets, canebrake, low bushes, or mesquite; bulky, loosely made of weed stalks, inner bark, grass, and sticks lined sometimes with inner bark or horsehair. *Eggs*: 2 to 4, pale blue, sparsely marked with dark brown and black.

GENERAL HABITS.—The shy, black-faced Abert Towhee is found in so few localities in New Mexico that it is of especial interest.

In thickets at Redrock, in late September, 1908, Major Goldman found it rather common, scratching about among the leaves on the ground; and at Gila in October, 1908, he caught glimpses of the birds as they dived into clumps of bushes. Their sharp, high-pitched and easily recognized notes were heard every day. They were less inclined to perch in plain view than the Canyon Towhee, and their motions and general habits appeared more like those of the Spurred Towhee.

On the Gila in 1873, Mr. Henshaw found the Abert Towhee abundant. He says that unlike the Canyon Towhee it appears "to shun the hills and open country generally, and to choose as its haunts the river bottoms and valleys, where in small flocks, it is confined to the densest thickets" (1875, p. 306).

LARK BUNTING: *Calamospiza melanocorys* Stejneger

PLATE 77

DESCRIPTION.—*Male*: Length (skins) 6.1–7.2 inches, wing 3.3–3.6, tail 2.6–2.8, bill .5–.6. *Female*: Length (skins) 5.7–6.5 inches, wing 3.2–3.3, tail 2.4–2.7, bill .5. Bill stout, conical, wings long and pointed, feet stout. *Adult male in summer*: Wholly black or slaty except for white edgings and white patch on wings, and white edgings on tail coverts and outer tail feathers. *Adult female in summer*: Upperparts grayish brown streaked with dusky, wing patch smaller, tinged with buffy; underparts white, streaked with dusky. *Adult male in winter*: Like adult female but chin black and feathers of underparts black beneath the surface. *Adult female in winter*: Like summer female but less grayish brown and paler markings more buffy. *Young*: Similar to adult female, but more buffy, feathers of upperparts edged with buffy white and streaks on underparts narrower.

RANGE.—Great Plains of middle North America. Breeds in Transition and Upper Sonoran Zones from southern Alberta, southern Saskatchewan, southwestern Manitoba, and west-central Minnesota south to northwestern Texas and New Mexico; winters south from southern Arizona and southern Texas on Mexican tableland to Guanajuato, and in Sonora and southern Lower California. Occasional in migration west of Rocky Mountains to southern California ("sporadically common") and east to western Iowa, southeastern Minnesota, and Ontario. Recorded from British Columbia.

STATE RECORDS.—On the plains of eastern Colorado, the Lark Bunting is an abundant breeder south to within a few miles of the New Mexico line. It is less common in western Colorado, but eggs have been taken at Navajo Springs near the southwestern corner of the State. In New Mexico, a single male was seen on the plains between Lopazville and Cabra Springs, June 24, 1903, and may have been nesting (Bailey). [In the vicinity of Santa Rosa, Pecos Valley, the latter part of June and the first of July in 1918, "males were floating about singing, one at a place." On the Staked Plains about 55 miles southeast of Roswell on May 30, 1919, a nest was found, and about 20 miles northwest of Lovington a recently destroyed nest with eggs was located (Ligon). About Vaughn the birds nested in profusion in 1919. Fifteen miles east, a nest with five fresh eggs was found, May 29. In eastern New Mexico, from Carlsbad to Cimarron, May 27–June 22, 1924, they were widely distributed (Ligon).]

Those that do not breed in New Mexico migrate late in the spring and return very early in the fall. In the Zuni Mountains at Agua Fria Spring, 8,000 feet, where it certainly did not breed, it was first seen July 22, 1905 (Hollister); near Zuni a few were noted July 25, 1873 (Henshaw); at 4,100 feet in the Guadalupe Mountains it was abundant July 31, 1901 (Bailey); near Kochler Junction, it was common from July 28 to September 20, 1913 (Kalmbach); a flock was seen at Mesilla Park, August 4, 1913 (Merrill); and the first two weeks in August, 1910, thousands were seen at Carlsbad (Dearborn). Thousands have also been observed in Guadalupe County (E. F. Pope). [A specimen was taken, August 2, 1916, at Silver City (Kellogg); on August 4, 1922, a male and female were seen near San Ildefonso Pueblo (Jensen); it was noted near Deming and Socorro August 26 and 27, 1917, and two were seen, August 28, 1917, west of Socorro (Ligon).] During September this is one of the most abundant birds on the open plains of New Mexico, ranging to 7,200 feet near Las Vegas (Bailey); Rinconada, 6,000 feet (Surber); and to Silver City, 6,000 feet (Hunn). The bulk departs in September, but a small flock was seen at Carrizozo, October 28, 1902 (Gaut), and it was common until late in October at Apache (Anthony).

In winter, on the Carlsbad Bird Reserve it was common in January, 1915, [and noted in December, 1916 (Willett)]. In the sand country about 40 miles east of Carlsbad several large flocks were seen and four specimens taken January 9, 1919 (Ligon)]. It winters abundantly at Mesilla Park (Merrill, 1913). Just south of New Mexico, at El Paso, Texas, one was noted on February 9, 1892 (Mearns), and sometimes it is found in southern Arizona the first half of February.

In the spring of 1904 it arrived at Rinconada on April 23 (Surber), and this is probably not far from an average date for northern New Mexico. A male was taken, April 29, 1915, in Apache Canyon, about 35 miles east of the Arizona line. [On May 7, 1920, several were seen in San Luis Pass (Ligon); on May 7, 1922, four males and one female were seen 2 miles south of the Santa Fe Indian School, and the same day 6 miles south of the school, a flock of about fifty. On May 25, 1919, a male and female were seen on the flats below La Bajada Hill (Jensen). On May 29, 1919, several were seen in brown plumage southwest of Roswell for a distance of 15 miles toward the Felix River (Ligon).] The larger part have passed across the State by the middle of May, but a flock of about thirty birds was seen at Shiprock as late as June 2, 1907 (Gilman). The fact that they were still in a flock would seem to indicate that they were late migrants, rather than local breeders.—W. W. COOKE.

NEST.—Sunk in the ground, sometimes under a bunch of weeds, or at the base of a cigar cactus; made of fine grass, small weed stems, and fine roots, sometimes lined with hair. *Eggs*: 4 or 5, plain pale blue, sometimes lightly spotted around the larger end with reddish brown, and with shell markings and a few wavy lines.

FOOD.—On isolated ranches, the Lark Buntings sometimes do serious injury to the grain crops in passing, especially in seasons when desert grass seed is scarce, but it is believed that when the country settles up, the loss to individuals will be negligible, and the destruction of weed seed and injurious insects is important. Among others they eat leaf beetles and weevils, but best of all grasshoppers to the extent of 78 per cent [near Koehler Junction, 1913 (Kalmbach)]. They also eat pigweed, smartweed, amaranth, and Russian thistle seeds.

GENERAL HABITS.—The Lark Buntings or White-wings, black in the breeding plumage and brown in winter, were first seen in north-western New Mexico by Mr. Hollister on July 22, 1905, when a small flock visited the open flat near Agua Fria Spring in the Zuni Mountains. He writes regarding them: "The males were in excellent black plumage, but I think they were fresh arrivals from the north, although it may seem early for the migration." Three years previous, in the south-eastern part of the State, he had found them five weeks later (September 2-3, 1902), fairly common in the valley west of the Guadalupe Mountains, and sparingly in all the valleys in the Guadalupe Mountains, and on the plains west of Roswell. At that time they were all "in brown plumage" (MS).

Previous to August 8, 1908, Major Goldman writes, "When we entered the Animas Mountains from Animas Valley none of these birds had been seen. When we returned to the valley on August 9, we found them numerous in large [black] flocks and they were seen nearly every day until I left the valley, August 19. They were common in flocks, apparently consisting almost entirely of black males, at Socorro, August 11-24, 1909." The thousands found by Doctor Dearborn at Carlsbad



From Handbook of Birds of the Western United States

LARK BUNTING

In his handsome nuptial plumage, showing the snowy epaulettes on his black coat to good advantage as he preens

August 1-14, 1910, were also mainly in the breeding plumage, though beginning to molt.

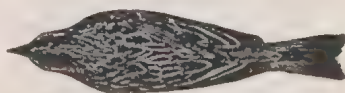
Near Las Vegas, from August 29 to September 1, 1903, small flocks were frequently seen passing over our camp, while numbers were flushed from the fences. At this time they were all in the brown plumage. Near Espanola early in September, 1906, they were also numerous in the fields and along the roads. In one place perhaps three hundred were seen on a wire fence, mostly in the brown plumage.

At Mesilla Park on August 1, 1913, and subsequently, Professor Merrill writes, "I saw a flock of nearly a dozen near the college, the males still with the black and white distinct. Usually they do not come till the first or middle of October, leaving again about May 1st. In winter they are very abundant in huge flocks. I have never recorded them breeding here, but the early appearance this year leads me to think that the southern breeding limit may not be far from here" (MS).

Like many other plains birds, the Lark Bunting, or Prairie Bobolink, as Mr. Cameron called it, has a notable song. Its flight song, Mr. Bent describes as "particularly rich and joyous." In Colorado, Mr. E. R. Warren says, courtship and love songs begin the middle of May, and from then on it is a common sight to see the males up in the air singing. They rise in the air, as Doctor Heermann describes it, "with a tremulous fluttering motion of the wings . . . singing the while and until again alighting, a disconnected but not unmusical chant" (1859, p. 16).

NEVADA SAVANNAH SPARROW: *Passérulus sandwichensis nevadensis* Grinnell

DESCRIPTION.—*Wing:* 2.6 inches. Median crown stripe grayish or buffy and line over eye yellowish or *whitish*, lateral crown stripes broadly black streaked on pale clay color; feathers of back with broad *black central areas margined with whitish*; tipplings of wing coverts and edgings of inner quills broadly *whitish*; throat (bordered by dark malar streaks), post-pectoral region, and crissum pure white, pectoral region sharply black-streaked on pale cream-buff ground.



RANGE.—Northeastern California, Nevada, northwestern Montana, and Great Basin to North Dakota and western Nebraska south in winter to northern Mexico.

FIG. 122. Savannah Sparrow (*Ammodramus sandwichensis*), skin

STATE RECORDS.—Nevada Savannah Sparrows breed abundantly in the northern half of Colorado though less commonly along the main chain of the Rocky Mountains to the southern part of the State, and in New Mexico they were common in the meadows around Taos, at 7,400 feet, July 14, 1904, where they were presumably breeding (Bailey). [They were found at Lake Burford, May 28 and 30 and June 6, 1918, also presumably breeding though no nests were found (Wetmore).] They were frequently seen by Kalmbach in tall grass areas near Koehler Junction, from the time of his arrival, July 28, to October 24, 1913. They are also found in east-central Arizona at Marsh Lake in the White Mountains (Jackson and Goldman).

With the advent of fall they appear in New Mexico as abundant migrants. They are common by the first of September and occur in migration as low as 5,000 feet at Apache (Anthony) and Cactus Flat (Goldman); as high as 9,900 feet at Hopewell in the San Juan Mountains, September 9, 1904, and to 10,500 feet near Costilla Pass, August 18, 1904 (Bailey). Most leave the State in October. [A specimen was taken November 5, 1916, at Faywood Springs, 20 miles south of Silver City (Kellogg).]

A few remain all winter, as they were seen, January 12, 1903, near Bear Canyon in the San Andres Mountains (Gaut), and January 3, 1903, at Mesilla Park (Ford). On the Carlsbad Bird Reserve they were twice seen in January, 1915, were noted during the winter of 1915-16, [and were abundant in December, 1916 (Willett).]

On the return migration in spring the species was noted on the southern border near Lake Palomas, April 12, 1892 (Mearns), and near Santa Rosa May 5-17, 1910 (Lantz and Piper). It was still present May 16, 1892, at Mosquito Springs near the southern boundary (Mearns).—W. W. COOKE.

NEST.—On grassy ground; made sometimes of wild hay and marsh grass, lined with fine grass and horsehair. *Eggs*: 3 to 6, pale brownish varying to dull whitish or greenish white, spotted with brown and occasionally a few darker marks.

FOOD.—One of the greatest insect eaters among the sparrows, it is an important destroyer of the alfalfa weevil. In infested regions in May, June, and July the weevil has made from one-half to two-thirds of its total food. It also eats caterpillars, fly larvae, plant lice, and, in addition, weed seeds.

GENERAL HABITS.—As Mr. Bailey says, among the many inconspicuous, plain, little striped-backed sparrows of the western United States the Savannah is "one of the plainest and most inconspicuous. Anywhere in the meadows, prairie grass, or weed patches, one may dart out from under your feet, zigzag over the grass-tops for a little way, and drop into the grass, hopelessly lost till he is again forced to take wing" (MS). If undisturbed, the Savannahs give their cheerful little song from the weed tops or fence posts, but they must be observed at a distance.

At Lake Burford late in May and June Doctor Wetmore found them in dead weather-beaten growths of bayonet grass near the shore, and late in September and October we found them there, both in the tules and weeds bordering the lakes and on the sagebrush-clad hills above.

In northern Nevada, Doctor Taylor found them common in the grassy marshes, in wild hay meadows, in willows, and in alfalfa fields.

WESTERN GRASSHOPPER SPARROW: *Ammódramus savannárum bimaculátus*
Swainson

DESCRIPTION.—*Male*: Length (skins) 4.2-5.1 inches, wing 2.2-2.6, tail 1.7-2, bill .4-.5. *Female*: Length (skins) 4.4-4.8 inches, wing 2.4-2.5, tail 1.8-2, bill .4. Tail short, double rounded and feathers sharp pointed. *Adults in summer*: Crown with median buffy stripe, between blackish stripes; nuchal patch ash-gray marked with reddish brown; feathers of back with black eye spots nicked with reddish brown; wings dusky with buffy gray edgings, yellowish olive shoulder patch passing to yellow on edge of wing; sides of head and broad superciliary stripe, dull buffy, yellowish above lores; underparts buffy changing to white below. *Adults in winter*: Brighter than summer adults, chest and sides sometimes indistinctly streaked. *Young*: Wing

without yellow and upperparts almost without reddish brown, the feathers conspicuously bordered with buffy and whitish; wing bars and underparts buffy whitish; chest streaked with dusky.

RANGE.—Breeds in Transition and Austral Zones from southeastern British Columbia, Montana, and southern Minnesota south to southern Texas, Colorado, Arizona (?), and California (west of the Sierra Nevada); winters from California, southern Texas, and Arizona south to Costa Rica, Guatemala, and Cape San Lucas.

STATE RECORDS.—Although breeding commonly in Texas to the east of New Mexico and south to southern California, yet the Western Grasshopper Sparrow mainly shuns New Mexico during the summer and rarely breeds in the Rocky Mountain region south of central Colorado. Nor is it common in New Mexico in migration; a few were found in the southern part of the Mesa Jumanes, September 26, 1902 (Gaut); one was taken September 27, 1913, near Koehler Junction (Kalmbach); one at 8,100 feet in the Manzano Mountains, October, 1903, and one near Roswell, September 21, 1903 (Gaut); it was also found in the Gila National Forest early in September, 1908 (Birdseye).

Though not known to winter in New Mexico, it must remain not far distant at this season, for a few were seen at Fort Thorn late in February, 1854 (Henry).

The first arrivals in regular spring migration appeared at Gage, April 17, 1885 (Mearns).

It is probably more common in New Mexico than these few records would indicate, since it can be easily overlooked, owing to its skulking habits.—W. W. COOKE.

NEST.—On the ground, bulky and deep, often more or less arched over; made of dried grasses, weeds, and stalks. *Eggs:* 3 to 5, white, spotted with reddish brown, sometimes with a few small black markings and touches of lilac.

FOOD.—37 per cent vegetable and 63 per cent animal matter. The entire weed seed element, including the seeds of such grasses as are troublesome on the farm, amounts to about one-fourth of the food. Of the animal, beetles, grasshoppers, and caterpillars are the most important. As a destroyer of insect pests it is most efficient. The injurious part of its food is only 3 per cent of the whole and the neutral 24 per cent, while the beneficial amounts to 73 per cent.

GENERAL HABITS.—On the dry open uplands the song of the Grasshopper Sparrow, named from the resemblance of his song to the "stridulation of the long-horned grasshopper," may be caught by a quick ear from the grassy roadside, where he would otherwise be overlooked. When discovered, as Mr. J. G. Tyler says, his tendency is to run away rather than to fly, and it takes fast walking to get him to take wing (1913, p. 78). In no way gregarious, the Yellow-winged, as he is often called, unlike many of the Sparrows, is seen only in pairs or families.

BAIRD SPARROW: *Ammódramus bairdi* (Audubon)

DESCRIPTION.—*Male:* Length (skins) 4.8–5.4 inches, wing 2.8–2.9, tail 2–2.1, bill .4. *Female:* Length (skins) 4.6–4.9 inches, wing 2.6–2.7, tail 1.9–2.1, bill .4. *Tail deeply emarginate, feathers narrow, and pointed at tip. Adults: Head ochraceous or buffy, crown streaked laterally with black; rest of upperparts light brown, feathers spotted with black and edged with buffy; throat bordered with blackish streaks, underparts white or pale buffy, chest and sides streaked with black. Bill pale flesh-color below, legs pale flesh-color, toes darker. Young: Similar to adults but feathers of*

head and back dusky, edged with pale buffy, and streaks on underparts less sharply defined.

RANGE.—Breeds mainly in Transition Zone from southwestern Saskatchewan and Manitoba south to northwestern Minnesota, central North Dakota, and central Montana (rarely); migrates through Arizona and New Mexico and winters from central Texas (probably Arizona) to Chihuahua and northern Sonora.

STATE RECORDS.—As a common migrant from the north the Baird Sparrow appears in New Mexico early in August. During the breeding season it is particu-



FIG. 123. Baird Sparrow, skin

larly a bird of the wide open plains of the north-central United States and the adjacent parts of southern Canada, but in the early fall migration it frequents the mountains as well, and was taken up even to 12,000 feet on Pecos Baldy, August 11, 1903 (Bailey). As early as August 7, 1908, the species was already present on Animas Peak at

5,800 feet (Birdseye), and three days later was noted in the Animas Valley at 5,000 feet (Goldman). It ranges in eastern New Mexico at least to Las Vegas, September 2, 1903 (Bailey); to near Koehler Junction, where specimens were taken, August 12, 13, 25 and September 8 and 11, 1913 (Kalmbach); occurs to near Roswell, September 21, 1902 (Gaut), and probably over the whole plains region of the eastern part of the State. On the other hand, it was noted on the Upper Pecos at 7,800 feet in the fall of 1883 (Henshaw); in the San Juan Mountains near Hopewell, 9,900 feet, September 7, 1904 (Gaut); in the mountains of the Gila National Forest, August 21-27, 1908 (Birdseye); and in the Jicarilla Mountains at 7,000 feet, September 23, 1903 (Gaut). None winter in the State, but migrants were still common on the Gila River October 16, 1873 (Henshaw).

The only spring record in New Mexico is that of four taken and others seen, April 28, 1913, along the Gila River near the Arizona line (Brooks and Law).—W. W. COOKE.

GENERAL HABITS.—In southeastern Arizona and southwestern New Mexico Mr. Henshaw found the sharp-tailed Baird Sparrow "in immense numbers, from September 20 till late in October, throughout the rolling plains along the bases of the mountains, and even quite high up among the foothills." It was usually with Savannah and Yellow-winged Sparrows. Like the Savannah, "it pursues its zigzag course for a couple of hundred yards, and then, suddenly turning sharply to one side, alights behind some friendly bush or tuft of grass. . . it is difficult to flush, but seeks rather to evade search by running nimbly through the grass, changing its course frequently, and hiding wherever possible, flying only when hard pressed" (1874, pp. 110-111).

WESTERN VESPER SPARROW: *Pooecetes gramineus confinis* Baird

DESCRIPTION.—*Male:* Length (skins) 5.5-6.2 inches, wing 3.1-3.4, tail 2.5-2.7, bill .4-.5. *Female:* Length (skins) 5.2-6 inches, wing 3-3.3, tail 2.3-2.7, bill .4-.5. Bill small, conical; wings longer than tail. *Adults:* Upperparts brownish gray, narrowly streaked; outer tail feathers partly white; wings with indistinct bars and epaulettes reddish brown; underparts dull white, more or less tinged with buffy and streaked with dusky on chest and sides; bill pinkish or pale lilac below. *Young:* Similar to

adults but markings less sharply defined; back and scapulars broadly edged with buffy grayish, and underparts grayish white.

RANGE.—Breeds in lower Canadian, Transition, and Upper Sonoran Zones from southeastern British Columbia, northeastern Alberta, southern Saskatchewan, and Manitoba south to Texas, New Mexico, Arizona (rarely), and eastern California; winters from California, Arizona, and central Texas to southern Mexico and Lower California.

STATE RECORDS.—The Western Vesper Sparrow is a common breeder on the mesas especially from 7,000 to 8,000 feet (Ligon), and in the open grassy parks of northern New Mexico south to Las Vegas (Mitchell), Santa Fe (Bailey), and Fort Wingate (Coues and Hollister). [It was very abundant north-

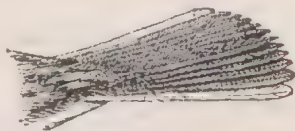


FIG. 124. Tail of Vesper Sparrow

east of Mount Taylor, 7,000-8,000 feet, where fresh eggs were found, June 22, 1916, and almost fresh eggs, July 25, 1916, while at the same time young were flying (Ligon). At Lake Burford it was common and a nest with young was found, June 6, 1918 (Wetmore). In northern Santa Fe County it is common on the pinyon flats and in the cultivated fields, where fresh eggs were found, May 15-July 15 (Jensen, 1922).] It was found common at Taos, July 11, 1904 (Bailey), [June, 1919 (Ligon)], and was, of course, breeding. A young bird just able to fly freely was collected near Hopewell at 9,900 feet, September 9, 1904 (Bailey). [On June 29, 1919, several were noted on Hamilton Mesa at about 10,000 feet, where they apparently had nests or young (Ligon).] A single bird was taken, July 25, 1904, at 10,400 feet, on the Upper Pecos (Bailey), in similar open grassy country. A few birds were also seen, July 17-24, 1905, about the lava fields of the Zuni Mountains near Agua Fria at 8,000 feet (Hollister).

In fall migration the species ascends to timberline and one was taken, August 20, on Culebra Mountain, at 13,000 feet, near the edge of the willows (Bailey), and on September 17, 1903, at the upper edge of timberline, 12,000 feet, in the Taos Mountains. Near Koehler Junction it was common after August 31, 1913 (Kalmbach). During migration, it is abundant in southern New Mexico, both in the mountains to 7,500 feet as at Beaver Lake, September, 1908 (Birdseye), and to the lowest valleys at Carlsbad, 3,500 feet, September 17, 1901 (Bailey). The height of fall migration is in September and October, and the birds have left the mountains by the last of October. In the valleys they remain later; one was seen, November 6, 1906, near Cactus Flat (Bailey); several, November 9-14, 1909, at 7,000 feet, near Lake Valley; and a few at Las Cruces, 4,000 feet, November 23-28, 1909 (Goldman).

It does not winter abundantly in New Mexico, but a single bird was once noted on January 8 at Fort Webster (Henry), and a few are to be found at Silver City every winter month (Hunn). [A few were noted in December, 1916, on the Carlsbad Bird Reserve (Willet).]

The first spring migrant was noted at Mesilla Park March 2, 1903 (Ford), at Silver City March 13, 1884 (Marsh), at Rinconada April 14, 1904 (Surber), and at Willis May 1, 1900 (Birtwell).—W. W. COOKE.

NEST.—Sunken in the ground, thick rimmed, well cupped; made of grass. Eggs: 4 to 6, greenish or brownish white, spotted and often blotched and streaked with reddish brown and lavender.

FOOD.—About two-thirds vegetable matter and one-third animal, the vegetable consisting of grain (doubtless largely from stubble fields and roads), 11 per cent; grass seed, 16 per cent; and weed seed 42 per cent. The animal food is made up largely of beetles, a small cicada and grasshoppers. (July 28-October 24, 1913, in Colfax County, grasshoppers 70 per cent, Kalmbach). Dung beetles, ground

beetles, leaf beetles, and such pests as click beetles and weevils seem to be preferred. During June and July in Utah in infested regions over half its food is alfalfa weevils. Cutworms, army worms, and other smooth caterpillars are also eaten freely. As it feeds farther out in the fields than many Sparrows it renders more valuable service than many of the other weed and insect destroyers.

GENERAL HABITS.—The sweet-voiced Western Vesper Sparrows or Bay-winged Buntings, as they are often called, are surprisingly common in northern New Mexico, not in as dry country as that which the horned larks frequent, but on the high plateau where there are grass, weeds, and bushes. As we drove through the weeds and sagebrush one would often dart up and, with flashes of white outer tail feathers, zigzag low to hide under sheltering cover.

They were common the middle of July, 1914, along the fences in the region of Taos and out on the Hondo mesa, singing in the fields at sunset. Flocks were flushed along the road near San Antonio Mountains from the rabbit brush (*Bigelovia*) and snake brush (*Gutierrezia*). They were also found in the open parks on the crest of the San Juan Mountains at 9,500 and 9,900 feet. At 9,900 feet, on September 9, 1904, a brood was found just able to fly freely.

In the high treeless Mesa Jumanes country, Mr. Gaut found them the most numerous of the Sparrows, and on September 27, 1903, "flocks were seen very frequently flying about the tall grass" (MS).

At Lake Burford, in 1918, Doctor Wetmore found the birds common through the sagebrush on the flats and knolls surrounding the lake, and the males sang constantly around his cabin. On June 6 a female flushed from a nest "ran away along the ground through the bushes with her wings extended and held stiffly above her back. The nest was placed in a small hollow at the foot of a partly dead sage where the trunk arched out over it, protecting and partly concealing it, a needed shield from the trampling feet of sheep that were grazing here. The nest . . . contained two young, apparently five or six days old, partly covered with grayish white down" (1920a, p. 405).

The Vesper Sparrow is a good illustration of what has been proved by bird banding—a system adopted by the Government to obtain the actual facts of migration. Attracted into cage traps by food, the birds are carefully banded with small aluminum bands bearing their number and the words "Notify Biol. Surv., Wash., D. C." At Santa Fe, Mr. Jensen has banded over fifteen hundred birds. As he stated, in the New Mexico Conservationist, "At present many thousands of birds are carrying a little aluminum band around the leg, and as they are captured again and again, either in the place where they were first banded or somewhere else, they help us to get a good record of their travels, their age, and many other things which we desire to know. The bands do not in any way hurt the birds or impede their movement, and they

furnish a means for collecting invaluable data which could not be secured by any other method." Of all his birds, Mr. Jensen says, "I am most proud of No. 39427, Western Vesper Sparrow," and well he may be, for it has given a striking example of the fact that migrating birds which spend the winter south of their breeding grounds often return to old familiar localities to nest. Banded on May 8, 1923, No. 39427 was first taken two months later, and after that on three successive years—June 20, 1924, April 15 (also August 4), 1925, and April 17, 1926.

WESTERN LARK SPARROW: *Chondestes grammacus strigatus* Swainson

PLATE 78

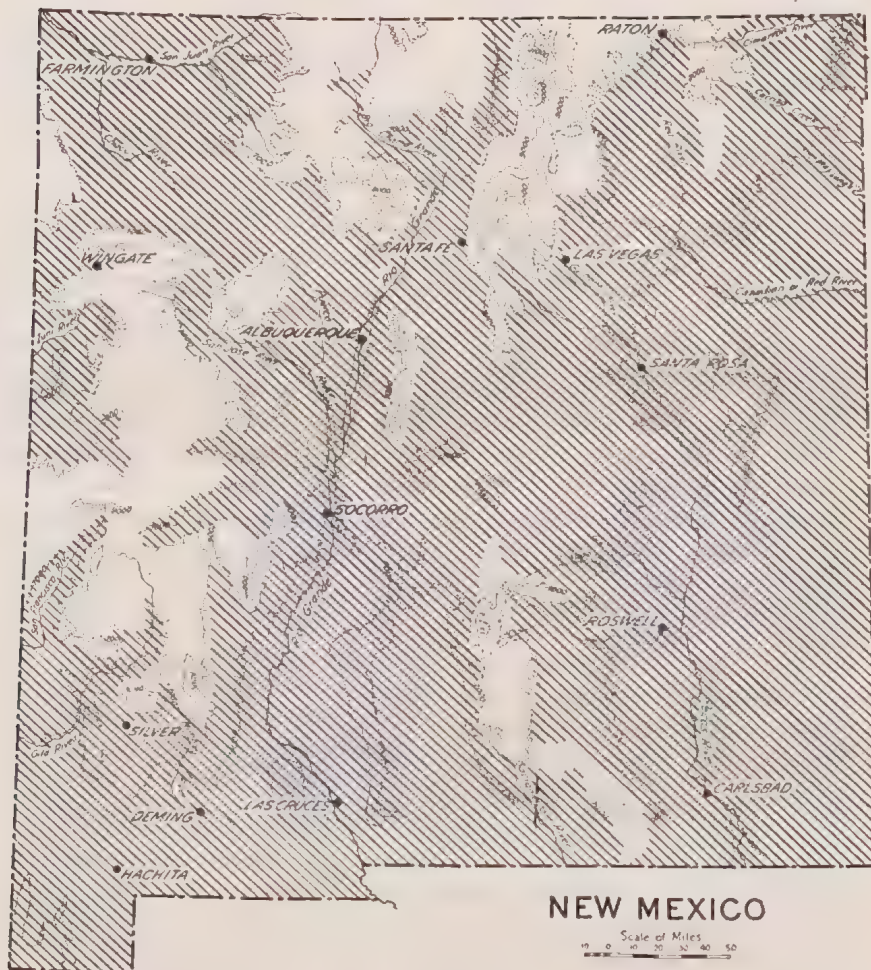
DESCRIPTION.—*Male:* Length (skins) 5.6-6.6 inches, wing 3.2-3.6, tail 2.5-3, bill .4-.5. *Female:* Length (skins) 5.5-6.7 inches, wing 3.1-3.5, tail 2.4-2.8, bill .4-.5. Tail long, graduated. *Adults:* Top and sides of head striped and patched with chestnut, black, and whitish or buffy; upperparts brownish gray, the back narrowly streaked with blackish; tail with middle feathers grayish brown, the rest black, tipped with white, on spread tail giving effect of *white corners*; outside feather bordered with white; wings with white band and white patch at base of primaries; underparts white with a small black chest spot; bill dark brown above, tipped with black, more or less bluish or lilac below. *Young:* Chestnut head markings wanting, crown striped like back, breast distinctly streaked with black.

RANGE.—Breeds mainly in Sonoran Zones from southern British Columbia and southern Saskatchewan south (as far east as central North Dakota and eastern Texas) to Mexican tableland (Coahuila, Durango, and Chihuahua); winters from northern California, Arizona, and southern Texas south through Lower California and southern Mexico to Guatemala.

STATE RECORDS.—The Western Lark Sparrow is generally distributed except in the mountains but is most common in the eastern part of the State. It is a common breeder over much of the lower parts of New Mexico, breeding in the lowest hottest valleys at Carlsbad (Bailey); Mesilla (Merrill); and up through the junipers on the slope of Mesa Yegua (Bailey); [fairly common on the pinyon flats of northern Santa Fe County (Jensen, 1922)]; to similar conditions in the upper part of the Bluewater Valley in the Zuni Mountains (Goldman); to Taos, 7,000 feet (Bailey); and to Houghton Canyon, 7,500 feet in the Datil Forest Reserve (Ligon). A specimen was taken May 2, 1914, at Silver City (Kellogg); and a few were seen in early May at Willis, 7,800 feet (Birtwell). Nests with eggs were seen at Santa Rosa, June 5, 1903 (Bailey). [A nest was found between May 23 and June 19, 1918, at Lake Burford, where the birds were fairly common (Wetmore). It was seen with young in the Cuchillo Hills, August 4, 1919 (Ligon).]

After the breeding season, it was common along Red River, Colfax County, from Mr. Kalmbach's arrival, July 28, until August 20, 1913. In the fall the species ascends somewhat higher and was noted at about 8,000 feet at Tres Piedras July 31, 1904 (Gaut), August 19, 1904, at about 9,700 feet in the Culebra Mountains, and August 25 at about 8,800 feet (Bailey). Retiring into Mexico to spend the winter, only a few remain in New Mexico after the last of September. They were noted at Chloride September 27, 1915 (Ligon); two birds were seen at Gallup the last week in September, and several September 30 in the foot-hills of the Chuska Mountains; a single bird was noted at Espanola October 17, 1904 (Gaut), and the last one at Mesilla, October 27, 1913 (Merrill).

On the return in spring, the species appeared, April 9, at Silver City (Hunn); April 12, 1915, at State College (Merrill); April 14, 1901, at Albuquerque (Birtwell); [several were seen, April 19, 1919, on the G. O. S. Ranch about 35 miles northeast of Silver City at about 7,500 feet (Ligon, 1924)]; one at Mesilla, April 30, 1903 (Ford); and it was noted at Las Vegas, May 2, 1902 (Atkins.)—W. W. COOKE.



MAP 60. WESTERN LARK SPARROW

Shaded area shows general breeding range in Upper and Lower Sonoran Zones

NEST.—Usually on the ground, but sometimes in bushes, mesquite, or mistletoe; a thick outer cup of dry weed stems, grass, and rootlets, or bark fibers, lined with leaves or horsehair. **Eggs:** 3 to 6, white, sometimes with a faint bluish or brownish tinge, speckled and lined chiefly on larger end with black and brown.

FOOD.—Insects 27 per cent and seeds 73 per cent. The Lark Sparrow, with the exception of the Grasshopper Sparrow and one other bird, is the most valuable grasshopper destroyer of our native sparrows. More than half its animal food is



From Handbook of Birds of the Western United States

WESTERN LARK SPARROW

The female above looks off calmly over the landscape, while her ardent mate below, like a strutting peacock, displays his charms—his elaborately striped head and handsomely marked fan tail

grasshoppers. On the prairies and plains it also does much good in helping to check the invasions of the Rocky Mountain locust. In an outbreak of locusts, they made up over 91 per cent of its diet. It also eats great numbers of alfalfa weevils. One half of its vegetable food consists of seeds of grain and grass. Pigeon grass and Johnson grass are both eaten freely. The weed seed, including pigweed, destroyed, more than twice outweighs the grain consumed, and the grain is doubtless largely waste; beneficial insects are less than 1 per cent, while injurious insects, including the alfalfa weevil, constitute 25 per cent of the food.

GENERAL HABITS.—When going down from the mountains in the breeding season, on reaching the nut pine and juniper belt we were greeted by the bright, vivacious, and strikingly burred song of the Western Lark Sparrow. A nest that we discovered on the high plains, we were pleased to find, was protectingly sunk in the ground under a catselaw.

Arriving at Mesilla Park late in March or early in April, the Lark Sparrow stays until about October; a few even into November. Here, Professor Merrill has found it only in the valley, where it prefers the settled regions, being common in the edges of groves and orchards that open onto fields, where it mostly nests. It may also be seen about corrals and along roadsides picking up spilled grain to vary its diet. When in thickets, the Professor says, "this species with the Painted Bunting and Western Blue Grosbeak will often hold a warbling concert, and one can not tell to whom goes the prize" (MS).

So adaptable are the Lark Sparrows that they will even exchange the open range for the city lawn and, as Mr. Tyler expresses it, lead "happy and useful lives amid the orchards and vineyards," affording pleasure to passersby with their rich songs and quaint courtship manners. They sing all day long, even during the hottest part of summer. Even at night, when most birds are asleep, they contribute to our pleasure. "Aside from the inimitable Western Mockingbird," Mr. Tyler writes, "I know of no other bird that sings so often at night. On more than one occasion I have refrained from sleep in order to listen to the notes that ring out with such wonderful sweetness when heard in the still night hours when all other bird voices are hushed" (1913, p. 79). Describing their song, Mr. Ridgway says, it "begins with a chant of clear ringing notes . . . then follows a silvery trill—the very expression of emotion—and then a succession of sprightly, sparkling notes, varied by rising and falling cadences, finally dying away until scarcely audible, but immediately resumed in all its sprightliness and vigor, and continued as before, until the singer seems actually exhausted by his efforts" (1877, p. 469).

[SLATE-COLORED FOX SPARROW: *Passerella iliaca schistacea* Baird

DESCRIPTION.—*Male*: Length (skins) 6.2–7.2 inches, wing 3.1–3.4, tail 2.9–3.4, bill .4–.5. *Female*: Length (skins) 6–6.6 inches, wing 3–3.2, bill .4–.5. Bill strictly conic, wings long and pointed, tail moderate, feet large and strong, *claws all very*

large. Adults: Entire upperparts slaty gray except for russet or dark brown on upper tail coverts, tail, and wings; underparts white, breast spotted and streaked with brown, usually with central blotch on breast. Young: Similar to adults but gray of upperparts tinged with brown, wings with indistinct rusty bars, underparts duller, with markings less sharply defined.

RANGE.—Breeds in Transition Zone from southeastern British Columbia and western Montana south to mountains of central Colorado; winters south through interior and southern California, Arizona (rare), and New Mexico east to Kansas.

STATE RECORDS.—The breeding range of the Slate colored Fox Sparrow extends south to Central Colorado. No specimens are on record and no authentic records have been found for New Mexico, but it has been reported seen and may occur in fall, winter, and spring; in which case it probably does not go south of the middle parts of the State.—W. W. COOKE.

NEST.—Usually less than three feet from the ground; bulky and well made of plant fibers, willow bark, and grass, lined with horsehair. *Eggs*; Usually 4, green or olive-buff, marked with purple and browns.

FOOD.—Principally insects and their larvae found in leaf mold.

GENERAL HABITS.—The Fox Sparrows of various species with their distinct gray and foxy brown plumage are our largest Sparrows and are found in the willows of the bottoms and the chaparral thickets of the mountain sides, where their rich musical songs ring out loud and clear to the enjoyment of all with listening ears.

In the Chuska Mountains near Cottonwood Pass, in a small meadow at 8,500 feet, and along the banks of a small stream which ran along the foot of a cold Canadian slope, Mr. Birdseye found these boreal birds abundant in October; but from their habit of exploring the wet meadows, several were unfortunately caught in traps set for shrews and red-backed mice.

ADDITIONAL LITERATURE.—SAUNDERS, A. A., Condor, XII, 80, 1910 (song).]

SCOTT SPARROW: *Aimophila ruficeps scotti* (Sennett)

DESCRIPTION.—*Male*: Length (skins) 5.3–6.1 inches, wing 2.5–2.8, tail 2.6–2.9, bill .4–.5. *Female*: Length (skins) 5.3–5.5 inches, wing 2.4–2.5, tail 2.3–2.7, bill .4–.5. *Adults*: Crown chiefly reddish brown, rest of upperparts gray, broadly streaked with chestnut; sides of head and neck and most of underparts light brown, tinged with buffy. In winter the color of the upperparts is obscured by the grayish edges of the feathers. *Young*: Streaked.

RANGE.—Upper Sonoran Zone in Arizona, New Mexico, and southwestern Texas south to Durango, Chihuahua, and Sonora. Recorded from Colorado.

STATE RECORDS.—The Scott Sparrow is quite widely distributed in southwestern New Mexico but is nowhere abundant. It ranges north to Glenwood, 5,000 feet, to the head of the Mimbres River, 6,500 feet (Bailey), and to the San Andres Mountains near Salinas Peak (Gaut). It was found in the Big Hatchet Mountains from about 5,500 feet to the summit at 8,000 feet the summer of 1908, and at about 5,500 feet in the Cloverdale, San Luis, and Florida Mountains (Goldman). [In June and July, 1926, it was quite common on the brushy slopes of the semi-desert mountain ranges in Hidalgo and Grant Counties, generally from 6,500 to 7,500 feet (Ligon).] It is common in the mountains of western Texas whence it ranges to New Mexico

in the Guadalupe Mountains, but it has not been recorded as yet in the Sacramento Mountains to the northward. The single specimen taken June 25, 1903, at 6,000 feet, 10 miles north of Cabra Springs, was a long distance from the regular range of the species.

It seems to be non-migratory and remains even in winter at about as high altitudes as it breeds.—W. W. COOKE.

NEST.—Concealed under a rock overhung with dead grass, or under the leaves of a mescal; made of grass and lined with finer grass. *Eggs*: Usually 3, pure white.

GENERAL HABITS.—At 6,500 feet on the side of Mesa del Agua de la Yegua, a persistent sparrow song, *tchee-dle, tchee-dle, tchee-dle, tchee-dle, tchee-dle*, called our attention to a Scott Sparrow, perched on top of an oak bush with head thrown back singing with more fervor than his plain little song would seem to merit, but it was his best and came from a full heart.

In the Huachuca Mountains, in Arizona, Mr. Swarth found the Scott an abundant resident, particularly in the foothill country covered with tall grass and a scattering growth of live-oaks (1904, p. 43).

In the mountains of Cochise County, Arizona, Mr. Willard found the Arizona Junco and the Scott Sparrow the two commonest birds, the Sparrows being rarely found above 6,800 feet, and most commonly on the scantily covered lower ridges and foothills where scattering oaks, madrones, and scrub mountain mahogany were the only trees, and there was plenty of bear grass and mescal (1912b, p. 195).

CASSIN SPARROW: *Peucaea cassinii* (Woodhouse)

DESCRIPTION.—*Male*: Length (skins) 5.1–5.8 inches, wing 2.3–2.6, tail 2.4–2.8, bill .4–.5. *Female*: Length (skins) 5.3–5.8 inches, wing 2.4–2.5, tail 2.5–2.7, bill .4–.5. Bill moderate, wings short and rounded, tail much rounded, of narrowly linear feathers with rounded ends, feet small and weak. *Adults*: *Upperparts* sandy brown broadly streaked with light gray (top of head also streaked with blackish), the feathers of back and scapulars sandy brown with black shaft streak, black cross-bar near tip, and ash-gray margins giving the effect of spotting or barring; upper tail coverts with transverse, roundish, or cordate blackish spots, middle tail feathers with indication of transverse bars from black shaft streaks; edge of wing yellow; underparts grayish, fading to white, tinged with brown on chest and sides. *Young*: Chest and upperparts distinctly streaked.

REMARKS.—In the field the sandy brown of the gray-streaked upperparts and in the hand the spotted or barred appearance of the back are diagnostic. The general color is decidedly paler than that of other birds having the bend of the wing yellow.

RANGE.—Breeds mainly in Lower Sonoran Zone, from southeastern Nevada, Arizona, eastern Colorado, and Kansas south to mouth of the Rio Grande and northern Sonora; winters to southern Sinaloa and central Tamaulipas.

STATE RECORDS.—The Cassin Sparrow is found in the open hottest parts of southern New Mexico, and in the eastern part of the State from Roswell to Montoya, and to 5,000 feet at Cabra Spring (Bailey). [It was common in the Pecos Valley and throughout the eastern section of the State, especially on the Staked Plains south of Clayton, May 27–June 22, 1924 (Ligon).] It also ranges up in the foothills of

Mount Capitan to the lower edge of the juniper belt at about 5,500 feet (Bailey). In western New Mexico it is much more restricted in range and has not been recorded north of Deming (Mearns) and Apache (Anthony).

A single specimen was taken in the fall of 1883 near Willis at 7,800 feet (Henshaw), where it was, of course, a straggler.—W. W. COOKE.

NEST.—On the ground, in low bushes or tufts of grass; deeply cupped, made of grass blades and stems, weed stems, bark, and vegetable fibers, lined with finer grass. Eggs: 3 to 5, pure white or bluish white.

GENERAL HABITS.—Although found sometimes in the tall grass and in meadowy tracts around springs, colonies of the sandy Cassin Sparrow are most numerous on dry plains with a growth of short grass interspersed with small shrubs and bushes. They are also seen on the mesquite plains in yucca patches, as between Roswell and Mount Capitan, or, as Mr. Henshaw found, on barren hillsides where cactus and only the most hardy vegetation can maintain a foothold and where the fierce heat of the sun's rays beats down upon the sandy ground.

When you pass through their country while the birds are in full spring song, one by one the hidden songsters spring up perhaps twenty feet into the air, when, with wings outspread and heads uplifted in a rapture of song, they give themselves to the air, floating slowly down as they sing. The rarely beautiful song, as Mr. Henshaw describes it, "begins with a low tremulous trill, followed by slow and plaintive syllables, the last of which is softer and more prolonged, and in a lower key. Though little varied . . . it yet possesses an indescribable sweetness and pathos, especially when heard, as is often the case, during the still hours of the night. During a night's march from Camp Grant to Camp Bowie, I do not think an interval of five minutes passed unbroken by the song of one of these Sparrows. Ere fairly out of hearing of the notes of one performer, the same plaintive strain was taken up by another invisible musician a little farther on, and so it continued till just before dawn" (1875, p. 289).

ADDITIONAL LITERATURE.—HERSEY, L. J., and R. B. ROCKWELL, Condor, IX, 191-194, 1907 (nest).—TORREY, BRADFORD, Nature's Invitation, 263-265, 1904 (song).

DESERT BLACK-THROATED SPARROW: *Amphispiza bilineata deserticola*
Ridgway

DESCRIPTION.—*Male:* Length (skins) 4.9-5.4 inches, wing 2.5-2.8, tail 2.4-2.7, bill .4. *Female:* Length (skins) 4.8-5.2 inches, wing 2.4-2.6, tail 2.3-2.5, bill .4. Bill moderate, conical; tail rounded, nearly equal to wings. *Adults:* *Upperparts* deep brownish gray, becoming nearly hair-brown on back and wings; tail blackish, outside feathers marked with white; *lores and throat patch black, line over eye, malar streak, and underparts white*, shading into grayish on sides and flanks; bill below, pale bluish gray with dusky tip. *Young:* Without distinct black markings, throat white, back and chest lightly streaked, wing bar buffy.

RANGE.—Sonoran Zones on arid plains from southeastern Oregon (probably), California, northern Nevada, northern Utah, southern and southwestern Colorado,

and western Texas south to Chihuahua, Sonora, and Lower California; winters from southern border of United States south.

STATE RECORDS.—The whole of New Mexico is included within the boundaries of the breeding range of the Desert Sparrow, but the species occurs only in the lower parts of the State. [It is abundant in Lower and Upper Sonoran Zones, reaching out in all arms of the Pecos River and the Rio Grande (Ligon, 1916-1918).] It has been taken north to Montoya, 4,500 feet, near Anton Chico, 5,500 feet, and Santa Fe, 7,000 feet (Bailey); Espanola, 5,500 feet (Surber); [Cuba on the Puerco River at 6,500 feet (Ligon, 1916-1918)]; Fort Wingate, 7,000 feet (Henshaw); and Shiprock, 5,000 feet (Gilman). Since it occurs in the Rio Grande Valley of Colorado and even in Baca County in the extreme southeastern part of Colorado, it undoubtedly occurs farther north in northeastern New Mexico than these records would indicate. It also occurs down to the bottoms of the lowest valleys at Carlsbad, 3,100 feet (Bailey); Las Cruces, 3,800 feet (Merrill); and in the Lower Gila Valley, 5,000 feet (Goldman).



From Handbook (Fuerter)
FIG. 125. (*Amphispiza bilineata bilineata*)

[Several pairs were seen, April 11, 1926, in the Santa Fe Canyon above La Bajada Hill (Jensen).] Eggs were found at Mesilla, May 20, 1913 (Merrill); at Silver City, June 3, 1885 (Marsh); young out of the nest at Cuervo, June 11, 1903; eggs at Carlsbad, July 30, 1901; and young still being fed, August 27, 1901, in the Guadalupe Mountains (Bailey). It nests abundantly along the west slope of the San Andres Mountains (Gaut). [Fresh eggs, and young out of the nest were found 15 miles east of Cutter, 6,000 feet, June 28 and 30, and July 1, 1917 (Ligon).]

The species is probably migratory in the northern part of its range, but it winters at least as far north as Tularosa (Gaut), and the northern part of the San Andres Mountains. It is an abundant winter bird at Mesilla (Merrill).—W. W. COOKE.

NEST.—In catsclaw, yucca, cactus, sagebrush, creosote, other bushes, mesquite, and low junipers; loosely made of dried grass, sage bark, and fine plant stems, lined with feathers, horsehair, or wool. Eggs: 3 or 4, bluish or pinkish white.

GENERAL HABITS.—On the stony mesa above the Pecos near Carlsbad, the handsome black-throated Desert Sparrow was one of the commonest birds, its black, white-cornered tail showing conspicuously as it flew ahead of us among the scattered thorn brush, mesquite, creosote, and other arid Lower Sonoran bushes and on up over the agave-speared hills. A nest partly lined with wool, as is the custom in the sheep country, on July 24, 1901, contained three half-feathered nestlings.

In the juniper basins at Santa Rosa the Desert Sparrow was fairly common, its bright song coming from the juniper tops. We found three well protected nests, two in cane cactus (*Opuntia arborescens*) and one wedged down in a bristling *Yucca glauca*, close beside a catsclaw, both of which were well along toward a happy conclusion; but an exposed nest in a juniper was pulled down, with feathers of the parent bird strewn the ground, blurred coyote or lynx tracks below telling of the tragedy (1906b, pp. 111-112).

Near Mesilla Park, Professor Merrill found, the amiable little Desert Sparrow was often imposed upon by the Dwarf Cowbird. "In that region it has a wide range but is found most abundantly on the mesa where it nests in Apache plume (*Fallugia paradoxa*), mimbres (*Chilopsis linearis*), mesquite, creosote, and condalia. A nest found May 20, 1913, in an Apache plume, already had the full quota of eggs and the female was brooding. The young were out before July first." In fall and winter, he concludes, the Sparrows come down from the mesa in large numbers and are very abundant and cheery winter birds (MS).

In summer the handsome Desert Sparrow sings gaily from the top of a bush with his head thrown back so that his black throat patch shows to advantage. His bright tinkling song has a variety of modifications. One is given by Doctor Taylor as "queet! queet! toodle-oodle-oodle-oodle!" (1912, p. 397), the *queets* being given with rising inflection. Another, heard frequently on the Pecos, given with a burr like that of the Lark Sparrow was "tra-ree-rah, ree-rah-ree." But whatever form *Amphispiza*'s song takes, his presence is one of the choice pleasures offered by the desert.

SAGE SPARROW: *Amphispiza nevadensis nevadensis* (Ridgway)

DESCRIPTION.—*Male:* Length (skins) 5.5-6.2 inches, wing 3-3.2, tail 2.8-3, bill .4. *Female:* Length (skins) 5.4-6.2 inches, wing 2.8-3.1, tail 2.6-3, bill .4. *Adults:* Upperparts light grayish brown, back usually distinctly streaked with dusky; tail and wings dull blackish, tail with outer web of outside feather white; edge of wing yellow; *sides of throat with a broken series of streaks*, orbital ring, malar streak and most of underparts white, chest with black spot, sides and flanks faintly tinged with brown, bill grayish blue below. *Young:* Similar to adults but largely streaked with dusky.



From Handbook (Fuentes)
FIG. 126. Sage Sparrow

RANGE.—Breeds on sagebrush plains of Upper Sonoran Zone from central Washington, central Idaho, and Montana, south to southern and western Colorado, northwestern New Mexico, southern Nevada, and eastern California; winters from Oregon, southeastern California, southern Nevada, and Utah to southwestern Texas, New Mexico, Arizona, and Chihuahua.

STATE RECORDS.—The Sage Sparrow breeds mainly north of New Mexico. [It is common in summer in the northwestern part of the State in sagebrush, and comes south to Gallina at the head of the Gallinas River, where it breeds (Ligon, 1916-1918). At Lake Burford a female was taken May 30, 1918, and others were seen on June 4 and 6, 1918. They were locally distributed in the sage grown areas (Wetmore).]

Migrants come into the State in the fall and remain through the winter. They were noted, September 21-22, 1908, at Ojo Caliente, in the sagebrush north of Zuni (Birdseye); and October 1, 1904, at Lake Burford (Bailey). [Four were noted, October 1, 1916, at White Water Creek (Skinner).] A specimen was taken, October 22, 1912, at Silver City (Kellogg). The species has been noted south to Fort Thorn

(Henry), Mesilla (Merrill), Deming (Bailey), Mexican Boundary Line (Mearns), the base of the San Andres Mountains, and Tularosa (Gaut).

In winter, it was seen near Tularosa, December 4, 1902, and was common in the San Andres foothills, January 12-23, 1903 (Gaut). It also winters at San Marcial (Goss, 1881, pp. 116-117); it was noted at Mesilla, January 7, 1905 (Metcalf); and winters at Silver City (Hunn). On the Carlsbad Bird Reserve, it was common in January, 1915, noted during the winter of 1915-16, [was common in December, 1916; and on the Rio Grande Bird Reserve (Elephant Butte), was noted, November 23-December 9, 1916 (Willett).]

In the spring migration the last one seen in 1892, near the Mexican Boundary, was on April 5 (Mearns), and one was taken as late as April 25, 1903, in the Organ Mountains (Ford).—W. W. COOKE.

NEST.—On the ground or in sage or other low bushes; made largely of fine shreds of sage bark, sage twigs, and dried grass stems; lined variously with dried grass, weed seeds and stalks, cowhair, and rabbit fur. *Eggs*: 3 or 4, greenish white or dull grayish white, speckled, chiefly around the larger end, with reddish brown mixed with a few darker markings.

GENERAL HABITS.—In northern Nevada, Doctor Taylor was immediately impressed with the similarity of habits between the Sage Sparrow and the Brewer Sparrow. "Both were paired and nesting at the same time," he says, "both could often be heard singing simultaneously, both were strict dwellers in the sagebrush association . . . and both had similar modes of flight"; but the Sage Sparrows were also found among the sparse vegetation of the open desert, where their cheery song was often the only sound heard (1912, p. 398). In the fall Mr. Henshaw observed small migrating companies of from three to ten Sage Sparrows frequenting the sagebrush on the desolate plains. They were very shy and most often seen running with great agility among the bushes, their motions being so quick that they might readily be mistaken for mice. In running their long tail was carried in a perpendicular position suggesting the wrens (1875, p. 276).

ADDITIONAL LITERATURE.—RUST, H. L., Condor, XIX, 38, 39, 1917 (nest with Cowbird eggs).

WHITE-WINGED JUNCO: *Júnco aikeni* Ridgway

DESCRIPTION.—*Male*: Length (skins) 6.2-6.7 inches, wing 3.2-3.7, tail 3-3.1, bill .5. *Female*: Length (skins) 5.9-6.6 inches, wing 3.2-3.3, tail 2.8-3, bill .4-.5. *Adult male*: Entire head and body almost *uniform light slaty gray* except for *abruptly white belly, wing bars and three white outer tail feathers*; bill pinkish white or flesh-color. *Adult female*: Similar but paler, upperparts tinged with brownish, and wing bars less distinct, frequently obsolete. *Young*: Entire body profusely streaked on whitish ground below.

COMPARISONS.—The White-winged Junco is the only Junco with white wing bars, and it and the Slate-colored (see p. 736), are the only two in New Mexico in which back and chest are the same color. In them, the line of color demarcation is horizontal.

RANGE.—Central Rocky Mountain region. Breeds in Canadian and Transition Zones in southeastern Montana, Wyoming, South Dakota, Colorado, and north-

western Nebraska; winters from Montana and the Black Hills to western Kansas and Colorado; casually to Oklahoma and New Mexico.

STATE RECORDS.—Breeding and wintering north of Colorado, and wintering in that State the White-winged Junco undoubtedly occurs not rarely in winter throughout much of the northern part of New Mexico, where at this season very little study has been given to bird life. One specimen was taken, January 20, 1904, at Arroyo Seco, 8,000 feet (Surber). [On November 19 and 20, 1926, it was seen quite commonly with the pink-sided form on Red River, near Red River town in Taos County; and in the Moreno Valley, Colfax County, from 9,000–10,000 feet (Ligon). On November 24, 1922, one was banded at Santa Fe, and on November 29, another was seen near Little La Bajada Hill (Jensen).]—W. W. COOKE.

NEST.—On the ground, usually near canyon bottoms; made of grass, lined with grass and hair. *Eggs*: Greenish white, lightly spotted with reddish brown and lavender.

GENERAL HABITS.—In Colorado, Professor Cooke found the White-winged the commonest winter junco, occurring from the plains to an altitude of 8,000 feet.

SLATE-COLORED JUNCO: *Júnco hyemális hyemális* (Linnaeus)

DESCRIPTION.—*Male*: Length (skins) 5.4–6.2 inches, wing 3–3.2, tail 2.5–2.8, bill .4–.5. *Female*: Length (skins) 5.2–6.1 inches, wing 2.8–3.1, tail 2.4–2.6, bill .4–.5. Bill small, conic, tail about as long as wing. *Adult male*: Head and body slate-color (darker on crown and paler on rump and sides) except for abruptly white lower breast, posterior underparts, and two outer tail feathers (six middle tail feathers slate-blackish edged with gray); iris dark reddish brown or claret-purple; bill pinkish with dusky tip (at least in winter). *Adult female*: Similar to male but the slate-color rather lighter and the second tail feather always (?) partly dusky. *Young in juvenal plumage*: Upperparts grayish brown, spotted or streaked with blackish; throat, chest, and sides dull buffy or buffy grayish, spotted or streaked with dusky; rest of underparts white; wings with brownish bar and edgings.

REMARKS.—As the juncos have no spring molt, the summer plumage with its more sharply contrasted color areas is the result of the wearing away of the brownish tips of the plumage (Chapman). Between the juvenal and adult plumages comes the immature, the male resembling the adult female but the female being browner, often with pinkish brown breast and sides.

RANGE.—Breeds in Hudsonian and Canadian Zones from tree limit in northwestern Alaska, northern Mackenzie, central Keewatin, and central Quebec south (in mountains to Massachusetts, Pennsylvania, and New York) to Michigan, Minnesota, central Alberta, and base of Alaska Peninsula; winters in southern British Columbia (occasionally) and Washington (casually), California (rarely), throughout the eastern United States and southern Ontario south to Gulf coast; casual in Oregon, California, Colorado, Arizona, and New Mexico.

STATE RECORDS.—The Slate-colored Junco breeds in northern North America from ocean to ocean, from Labrador to Alaska. The great majority of the Alaska, Yukon, and Mackenzie breeding birds go southeast in fall to winter in the United States east of the Rocky Mountains; but a small minority seems to pass to the southward and appear irregularly in the western United States from Colorado and New Mexico to California. Several came to Hondo Canyon the last of December, 1903; one was secured, January 4, 1904, at 8,000 feet; another was taken, March 12, 1904, at Cieneguilla, 6,000 feet (Surber); two were noted in March, 1907, at Shiprock, (Gil-

man); one at Santa Fe, March 25, 1892 (Coale). One was collected, October 26, 1906, in the Mogollon Mountains on Willow Creek at 8,500 feet (Bailey), and one, November, 3 at Albuquerque (Birtwell). Thus the records show this form to be an occasional visitor to New Mexico, principally in the northern part, from October 26 to March 25, and at altitudes from 5,000 to 8,500 feet.—W. W. COOKE.

NEST.—In all species, usually on the ground, well hidden; rather bulky, made largely of dried grass stems and rootlets, lined with softer materials. *Eggs*: Generally 4 or 5; white, greenish, or buffy, speckled with reddish brown.

FOOD.—The total food of all the species and subspecies of juncos examined shows animal matter 22 per cent, and vegetable matter 78 per cent; but in summer when the birds are mainly in the mountains the insect food amounts to about one-half. Of this injurious insects amount to 25 per cent, and neutral insects 16 per cent. The summer vegetable food is composed of seeds and wild berries. During the rest of the year when the birds are in the lower country the animal food is only 9 per cent, the vegetable 91 per cent. The vegetable food is mainly weed seed, including pigeon grass, crab grass, ragweed, amaranth, lambs' quarters, wild sunflower, and Russian thistle. This extensive destruction of weed seeds makes the juncos stay on agricultural land of great benefit.

GENERAL HABITS.—The juncos of whatever species, except in the nesting season, are found in flocks, frequently in weed patches or brushy thickets, their gray or blackish backs and white outer tail feathers naming them as they fly. The Slate-colored is familiarly known as the Snowbird or Black Snowbird in distinction from the white Snowflake which comes from the Arctic regions to the northern States, for it appears in the lowlands with cold weather. When coming about houses the juncos are easily tamed, gladly accepting crumbs from the door when snow covers the weed patches; and their quiet friendly ways and cheerful twitter make them good winter neighbors.

It is interesting to hear that a Slate-colored Junco banded in Minnesota has been taken in New Jersey.

SHUFELDT JUNCO: *Júnco oregánuš shúfeldti* Coale

PLATE 79

DESCRIPTION.—*Male*: Length (skins) 5.5–6.2 inches, wing 3–3.2, tail 2.6–2.8, bill .4–.5. *Female*: Length (skins) 5.4–5.9 inches, wing 2.8–3.1, tail 2.3–2.7, bill .4. *Adult male*: Head, neck and chest, blackish slate (crescentic), back dull brown, rump dark slate, and tail darker with two outer pairs of feathers pure white; median underparts white, sides pinkish brown; bill and legs light. *Adult female*: Colors more subdued, with more rufous washing on sides.

COMPARISONS.—Of the eight Juncos found in New Mexico only two, the White-winged and Slate-colored, have the back and chest the same color. Of the remaining six, in which the back and chest are different in color, three have pinkish sides—the Shufeldt, Montana, and Pink-sided—and three have gray sides—the Arizona, Red-backed, and Gray-headed. Of the pink-sided ones, the Shufeldt is the only one with blackish foreparts, the Montana and Pink-sided having gray foreparts. Of these, the Montana is slate-color anteriorly, the Pink-sided ash-gray on throat and chest. Of the three gray-sided ones, the Arizona is the only one with yellow eyes and black bill, and of the two brown-eyed ones, the chest and sides of the Gray-headed are darker than in the Red-backed.

RANGE.—Breeds in Boreal Rocky Mountain region from interior of British Columbia east to central western Alberta, and south to southern Oregon, winters over entire Rocky Mountain tableland, in southern British Columbia, Montana, Utah, and eastern Colorado south to western Texas, New Mexico, Arizona, Chihuahua, and Sonora; casual in northern Lower California.

STATE RECORDS.—Of the Juncos which do not breed in New Mexico but come from the north to winter in the State, the Shufeldt is probably the most common. It was first noted September 18, 1904, at Lake La Jara, 7,500 feet (Bailey). By the first of October, 1908, it was the commonest of the Juncos noted in the Chuska Mountains, being present in flocks of thousands (Birdseye), and ranging from 9,000 feet on the top of the mountains down to 5,000 feet at Shiprock and the San Juan Valley, where the species was equally common through October and November. It was abundant the latter part of October, 1908, in the Mogollon Mountains from 7,000–10,000 feet; apparently about as common as *dorsalis*, these two species together outnumbering all other birds combined (Goldman). In early November, 1906, *shufeldti* and *earnsi* were the commonest Juncos seen in the Gila Valley at Cliff, 5,000 feet; *shufeldti* was found November 28, 1889, at Deming (Bailey).

But notwithstanding the enormous numbers of this species in western New Mexico, it is not so numerous in the eastern part of the State. It was found at Las Vegas Hot Springs December 12, 1882 (Batchelder); at Albuquerque ten were reported December 25, 1902 (Harman); and at Arroyo Seco it was the commonest wintering Junco (Surber); in the Guadalupe Mountains it was abundant above 4,000 feet, January, 1915; [a small flock was seen in Carlsbad, December, 1916 (Willett)]; but on the east slope of the Manzano Mountains it was very rare (Gaut).

The last one noted in 1889 at Cooney was on April 19, and in 1890 at Carlisle on April 17 (Barrell).

The type of *Junco hyemalis shufeldti* Coale¹ was collected at Fort Wingate October 13, 1885.—W. W. COOKE.

GENERAL HABITS.—One of Mr. Jensen's banded Shufeldt Juncos, No. 28721, nesting in the Boreal Rocky Mountain region, perhaps as far north as British Columbia, has returned for three years to winter, not merely in New Mexico, but actually in the same place—the campus of the Indian School of Santa Fe. Banded December 1, 1922, it was retaken, on its return from the north, February 14 (and 22, and March 15), 1923; after another nesting season, December 13, 1923; again December 7 (10, 18, 23), 1924; and finally February 17, 1926.

Another Shufeldt Junco, No. 151657, acquired the trap or "easy food" habit. Banded on December 28, 1924, it was retaken the following day and on all but six days during January, when, as Mr. Jensen says, with patient reticence, it "was taken as often as six times a day" (MS).

MONTANA JUNCO: *Junco oreganus montanus* Ridgway

DESCRIPTION.—*Male*: Length (skins) 5.5–6 inches, wing 3–3.3, tail 2.6–2.8, bill .4. *Female*: Length (skins) 5.2–5.7 inches, wing 2.9–3, tail 2.3–2.6, bill .4. *Adult male*: Head, neck, and chest, slate-color, lores blackish; back and scapulars dull light brown; sides pale pinkish brown, belly white, tail with two outer pairs of feathers

¹ Coale, H. K., Description of a New Subspecies of Junco from New Mexico, Auk, IV, 330–331, 1887.



GREEN-TAILED TOWHEE

CANYON TOWHEE

SHUFELDT JUNCO

GRAY-HEADED JUNCO

mainly white; bill flesh-colored. *Adult female*: Similar but usually duller, and the gray averaging lighter, the brown of back often extending up over back of head. *Young in first winter*: Plumage softer, and duller, feathers edged largely with brown.

COMPARISONS.—The Montana Junco is similar to the Shufeldt but has the head, neck, and chest *slate-color* instead of black. (See p. 737.)

RANGE.—Breeds in Canadian Zone from southern Alberta south to northwestern Montana, northern Idaho, and central northern Utah; winters south to Arizona, New Mexico, Chihuahua, and Texas; casually east to Kansas, Massachusetts, and Maryland.

STATE RECORDS.—The present knowledge of the range of the Montana Junco in New Mexico is rather limited. Its distribution in the State is undoubtedly more extensive than the few notes now available would indicate. It has been taken at Lake Burford, 7,600 feet, September 27, 1904, and Gallinas Mountains, October 9, 1904 (Gaut); Mogollon Mountains, 8,300–8,500 feet, October 18–26, 1906 (Bailey); Gila, 4,000 feet, October 10, 1908, Kingston, 9,000 feet, November 4, 1908 (Goldman); Las Vegas Hot Springs, December 6, 1882 (Batchelder); Arroyo Seco, 8,000 feet, February 6, 1904 (Surber). In most of these cases only a few birds were seen, whereas it seems probable that quite a share of the individuals of the subspecies spend the winter in New Mexico. —W. W. COOKE.

GENERAL HABITS.—A few Juncos of this subspecies were seen in the Gallinas Mountains early in October, 1904, in the flocks of the Gray-headed (*caniceps*). The stomach of one taken was full of seeds, largely pigweed.

PINK-SIDED JUNCO: *Júnco meánsi* Ridgway

Male: Length (skins) 5.7–6.1 inches, wing 3.1–3.3, tail 2.6–2.9, bill .4. *Female*: Length (skins) 5.4–5.9 inches, wing 2.9–3.4, tail 2.6–2.9, bill .4. *Adult male*: Head, neck, and chest gray, snout above, pale gray below; lores blackish slate, back and scapulars brown; rump and upper tail coverts gray, tail with two outer pairs of feathers mostly white, the third largely white; median underparts white, sides and flanks broadly pinkish; bill flesh-color. *Adult female*: Similar, but colors averaging less pure, the head more brownish, the sides less pinkish, and, usually, second tail feather largely dusky. *Young in juvenal plumage*: Head and back brownish, broadly streaked with blackish, wings with two brownish buff bars; underparts streaked, on buffy or grayish ground.

RANGE.—Breeds in Boreal region from southwestern Saskatchewan to northern Wyoming, southern Idaho and northeastern Utah; winters south through Wyoming, Utah, and Colorado to western Texas, southern New Mexico, Arizona, and north-eastern Mexico.

STATE RECORDS.—In western and northwestern New Mexico, the Pink-sided Junco is one of the common winter birds. It arrives in October—Chuska Mountains, 8,000 feet, October 1, 1908 (Birdseye)—and is abundant in the northwestern part of the State. It ranges at least as far south as the Mogollon Mountains, where it was noted, October 26, 1906, at 8,500 feet on Willow Creek; at Cliff, 5,000 feet, November 7–9, 1906 (Bailey); and Silver City, 6,000 feet, all winter (Marsh). To the northeastward it was common along the Red River, Colfax County, October 21, 1913 (Kalmbach); was taken at Arroyo Seco, 8,000 feet, February 7, 1904 (Surber); and at Las Vegas, December 6–22, 1882 (Batchelder).

In the spring migration, the last seen at Silver City in 1884, was on March 25 (Marsh); at Carlisle, in 1890, on April 10 (Barrell).—W. W. COOKE.



GREEN-TAILED TOWHEE

CANYON TOWHEE

SHUFELDT JUNCO

GRAY-HEADED JUNCO

mainly white; bill flesh-colored. *Adult female*: Similar but usually duller, and the gray averaging lighter, the brown of back often extending up over back of head. *Young in first winter*: Plumage softer, and duller, feathers edged largely with brown.

COMPARISONS.—The Montana Junco is similar to the Shufeldt but has the head, neck, and chest *slate-color* instead of black. (See p. 737.)

RANGE.—Breeds in Canadian Zone from southern Alberta south to northwestern Montana, northern Idaho, and central northern Utah; winters south to Arizona, New Mexico, Chihuahua, and Texas; casually east to Kansas, Massachusetts, and Maryland.

STATE RECORDS.—The present knowledge of the range of the Montana Junco in New Mexico is rather limited. Its distribution in the State is undoubtedly more extensive than the few notes now available would indicate. It has been taken at Lake Burford, 7,600 feet, September 27, 1904, and Gallinas Mountains, October 9, 1904 (Gaut); Mogollon Mountains, 8,300–8,500 feet, October 18–26, 1906 (Bailey); Gila, 4,000 feet, October 10, 1908, Kingston, 9,000 feet, November 4, 1908 (Goldman); Las Vegas Hot Springs, December 6, 1882 (Batchelder); Arroyo Seco, 8,000 feet, February 6, 1904 (Surber). In most of these cases only a few birds were seen, whereas it seems probable that quite a share of the individuals of the subspecies spend the winter in New Mexico.—W. W. COOKE.

GENERAL HABITS.—A few Juncos of this subspecies were seen in the Gallinas Mountains early in October, 1904, in the flocks of the Gray-headed (*caniceps*). The stomach of one taken was full of seeds, largely pigweed.

PINK-SIDED JUNCO: *Júnco meánsi* Ridgway

DESCRIPTION.—*Male*: Length (skins) 5.7–6.1 inches, wing 3.1–3.3, tail 2.6–2.9, bill .4. *Female*: Length (skins) 5.4–5.9 inches, wing 2.9–3.4, tail 2.6–2.9, bill .4. *Adult male*: Head, neck, and chest gray, slaty above, pale gray below; lores blackish slate, back and scapulars brown; rump and upper tail coverts gray, tail with two outer pairs of feathers mostly white, the third largely white; median underparts white, sides and flanks broadly pinkish; bill flesh-color. *Adult female*: Similar, but colors averaging less pure, the head more brownish, the sides less pinkish, and, usually, second tail feather largely dusky. *Young in juvenal plumage*: Head and back brownish, broadly streaked with blackish, wings with two brownish buff bars; underparts streaked, on buffy or grayish ground.

RANGE.—Breeds in Boreal region from southwestern Saskatchewan to northern Wyoming, southern Idaho and northeastern Utah; winters south through Wyoming, Utah, and Colorado to western Texas, southern New Mexico, Arizona, and northeastern Sonora.

STATE RECORDS.—In western and northwestern New Mexico, the Pink-sided Junco is one of the common winter birds. It arrives in October—Chuska Mountains, 8,000 feet, October 1, 1908 (Birdseye)—and is abundant in the northwestern part of the State. It ranges at least as far south as the Mogollon Mountains, where it was noted, October 26, 1906, at 8,500 feet on Willow Creek; at Cliff, 5,000 feet, November 7–9, 1906 (Bailey); and Silver-City, 6,000 feet, all winter (Marsh). To the northeastward it was common along the Red River, Colfax County, October 21, 1913 (Kalmbach); was taken at Arroyo Seco, 8,000 feet, February 7, 1904 (Surber); and at Las Vegas, December 6–22, 1882 (Batchelder).

In the spring migration, the last seen at Silver City in 1884, was on March 25 (Marsh); at Carlisle, in 1890, on April 10 (Barrell).—W. W. COOKE.

ARIZONA JUNCO: *Júnco phaeonótus palliátus* Ridgway

DESCRIPTION.—*Male*: Length (skins) 5.9–6.5 inches, wing 3–3.3, tail 2.7–3, bill .4–.5. *Female*: Length (skins) 5.6–5.9 inches, wing 2.9–3, tail 2.5–2.8, bill .4–.5. *Adults*: Head and neck deep gray, throat, chest, and sides decidedly paler gray, rest of underparts white; lores and chin blackish; back and scapulars bright brown, outside tail feather with inner web mostly white, second much less white; wings marked with rusty or rufous; iris bright yellow, bill black above, yellowish below, legs yellowish brown, toes darker.

REMARKS.—The Arizona Junco is the only one of the southern type, with blackish bill and yellow eyes, occurring in New Mexico.

RANGE.—Apparently resident in Transition Zone of mountains of eastern Arizona, southwestern New Mexico, and northern Mexico, in Coahuila, Chihuahua, and Sonora.

STATE RECORDS.—Though breeding for the most part in Arizona and northern Mexico, a few individuals of the Arizona Juncos enter southwestern New Mexico and breed in the Animas Mountains, where they were found common at 7,500–8,500 feet on Animas Peak late in July, 1908 (Goldman). They were seen in the Big Hatchet Mountains, May 21, 1892, and on the summit of the highest peak of the San Luis Mountains on the United States-Mexican Boundary, July 19, 1892 (Mearns)—W. W. COOKE.

ADDITIONAL LITERATURE.—WILLARD, F. C., Condor, XI, 129–131, 1909 (nest).

RED-BACKED JUNCO: *Júnco dorsális* Henry

DESCRIPTION.—*Male*: Length (skins) 5.8–6.4 inches, wing 3.2–3.4, tail 2.9–3, bill .4–.5. *Female*: Length (skins) 5.5–6.1 inches, wing 3–3.2, tail 2.7–2.9, bill .4–.5. *Adults*: Upperparts ash-gray except for bright reddish brown back; chest and sides ashy white; iris brown, bill flesh-colored.

COMPARISONS.—The absence of reddish brown on the wings and the color of bill and eyes distinguish the Red-backed from the Arizona Junco.

RANGE.—Breeds in Transition and Canadian Zones of high mountains in Arizona and north central to southern New Mexico; winters south to southwestern Texas, Chihuahua, and Sonora.

STATE RECORDS.—The Red-backed Junco was described in 1858 by Henry, and the explicit statement is made in the original description that the type locality is Fort Thorn. This has been accepted without question as the actual type locality, but in a publication made in 1859 giving a summary of all his bird observations in New Mexico, Henry says of *Junco dorsális* "Found only near Fort Stanton, among the mountains, where I should judge they nested. Never observed during winter." The species is now known to be a common breeder near Fort Stanton, while it does not breed at Fort Thorn and occurs there only in migration or in winter, at which season Henry says he has never seen it. Rereading the original description with these facts in mind it is evident that the locality Fort Thorn belongs under the preceding species, *Toxostoma dorsális* = *Toxostoma crissalis*, which has no type locality ascribed to it, and by a printer's error was placed under *Junco dorsális*. The real type locality of the Red-backed Junco is therefore to be considered as Fort Stanton.

The Red-backed Junco probably breeds in most if not all of the mountains of New Mexico where it occurs. Those that had presumably come down from the mountains were common along the Red River in Colfax County, October 21, 1913 (Kalmbach). The species breeds in the eastern part of the State up to Cloudercroft, 9,000 feet (Green). [It nests in the south end of the Sacramentos in abundance, a

nest with four fresh eggs was found 20 miles northeast of Cloudercroft at 7,000 feet, June 16, 1917 (Ligon)], at least to an equal altitude on the Capitan Mountains (Gaut), and south to the Guadalupe Mountains (Bailey), breeding in these last at 7,500-8,500 feet.

In western New Mexico it was taken, June 29, 1905, at Fort Wingate, 7,000 feet (Hollister), and was undoubtedly breeding there as it was also at Bear Ridge, in the neighboring Zuni Mountains, where it was taken, June 15, 1909 (Goldman). Here it was breeding most commonly at about 8,000 feet, but a few were seen near the summits at 9,000 feet. It was collected at about 9,000 feet in the San Mateo Mountains, August 16, 1905, and at about the same altitude in the Datil Mountains, October 6, 1905 (Hollister); in both cases having probably nested not far distant. Near the head of the Mimbres River at 7,500-8,000 feet it was breeding, May 24, 1906 (Bailey), and at Big Rocky Creek, 8,000 feet, August 21, 1908 (Birdseye). [It nests to the south end of the Black Range. On July 28, 1920, a nest with three fresh eggs was found 10 miles north of Pinos Altos, at 6,200 feet; on August 17, 1919, a nest with eggs was found 30 miles southwest of Chloride, south of Main Diamond, at 7,200 feet (Ligon, 1916-1918).] Later in the season in the neighboring Mogollon Mountains it was abundant from 7,000 feet to above 10,000 feet during October (Goldman), but it is not probable that it nested much if any above 9,000 feet. At Lone Mountain a specimen was taken by C. H. Marsh, January 15, 1882 (Batchelder).—W. W. COOKE.

GENERAL HABITS.—A typically well concealed nest of the Red-backed Junco found by Mr. Ligon in the Chloride region was hidden under a small pine that had spread over the ground and caught dead leaves, making a thick supporting mat as well as a dark base for the inconspicuous nest of bark and dead grass with its slight lining of hair. To further protect it from prowling enemies, a small boulder stood beside it, blocking the entrance. Perhaps the builder had had sad experiences. A troubled mother found on her nest by Mr. Henshaw, "glided off through the grass, fluttering about and feigning lameness."

During the nesting season, Major Goldman found this Junco one of the most abundant birds in the middle slopes of the Zuni Mountains, while a few were to be seen in the densest growth on the highest north slopes. The males were heard singing at all hours of the day from perches on fallen tree tops and small pines.

In late July, when Mr. Gaut secured a fledged young in the Capitan Mountains, the Juncos were very numerous at the higher altitudes, especially in deep canyons, where they could be seen feeding among the dead leaves, as he said, scratching much like chickens.

In late August one shot from a flock, at the upper edge of the yellow pines in the Jemez Mountains, had nearly completed its molt into adult plumage, though its head still had a speckled appearance, and many pinfeathers were in evidence.

Late in October, Major Goldman found the Red-backs abundant from below Mogollon up to the higher summits of the range. Small parties were everywhere hopping about, scratching among the leaves through the thin snow, and when startled rising and alighting on the

lower branches of trees. They were sometimes seen mingled with the Shufeldt Juncos. At this season the two species were present in about equal numbers and over the upper slopes of the mountains together outnumbered all other birds combined.

GRAY-HEADED JUNCO: *Júnco cániceps* (Woodhouse)

PLATE 79

DESCRIPTION.—*Male*: Length (skins) 5.6–6.2 inches, wing 3.2–3.4, tail 2.7–2.9, bill .4–.5. *Female*: Length (skins) 5.5–5.9 inches, wing 2.9–3.3, tail 2.5–2.8, bill .4–.5. *Adults*: Slate-gray except for blackish lores, *bright reddish brown back patch*, white median belly, and parts of three outer pairs of tail feathers; bill flesh-color, legs yellowish brown, toes darker.

COMPARISONS.—The Gray-headed is similar to the Red-backed Junco (see p. 740), but has a shorter tail, smaller bill, and chest and sides much *darker gray*, the white of belly more clearly separated from the gray.

RANGE.—Breeds in Hudsonian and Canadian Zones in southern Wyoming, Colorado, Utah, Nevada, and northern New Mexico; winters at lower elevations in San Diego district, California (rarely), Arizona, Sonora, Chihuahua, and western Texas.

STATE RECORDS.—More records have been made of the occurrence of the Gray-headed Junco in New Mexico than of any other member of the genus, indicating its great abundance in the State, where it is the breeding form of the high mountains in the northern part [8,500 feet to above timberline (Ligon, 1919)]. On the Pecos near Willis, at 8,000 feet, July 15, 1903, a nest was found containing young just hatched, while on July 24, at 11,000 feet below Pecos Baldy, young out of the nest were seen, and as late as August 7, a nest with eggs. Breeding from 8,000 to 11,600 feet (at the foot of Pecos Baldy), they were most abundant at 11,000 feet, where they were the commonest birds. At 8,000 feet near Black Lake as late as September 7, a young though full grown bird was being fed (Bailey). The next year in the region of Taos they were breeding from 8,200 feet in Hondo Canyon to timberline at 12,000 feet, and noted feeding large young in August. [In June, 1922, they were fairly common and evidently breeding on Lake Peak from 11,500–12,400 feet (Jensen).]

The southern end of the Rocky Mountains, known as the Sangre de Cristo Range, seems to be the part of New Mexico where the Gray-headed Junco is best known to breed, but since it breeds in all of the high mountains of southern Colorado, it undoubtedly does also in the San Juan, the Jemez, and the Chuska Mountains in New Mexico. In the Chuskas it was found during July, 1907 (Gilman), where young birds were seen, and it was also found breeding on Bear Ridge in the Zuni Mountains (Goldman). Early in September, 1904, it was found common from the foot of the San Juan Mountains at 7,500 feet to the top of the range at 10,000 feet, and during the latter part of August and the first week of September, 1906, was abundant in the upper part of the Jemez Mountains to 10,000 feet on Pelado Peak (Bailey). In both these latter cases fall migration may have already begun, but probably most of the birds had spent the summer in these mountains.

In the fall migration it spreads over all of New Mexico west of the Rio Grande, and east of that river south to the Manzano Mountains, October 8–14, 1903, and to Corona, October 12, 1902 (Gaut). It was noted near Kingston, 9,000 feet, November 4, 1909 (Goldman), at 8,300 feet in the Mogollon Mountains, October 18, 1906 (Bailey), and spent the winter in the Animas Mountains close to the United States—Mexican boundary (Anthony). During this latter season the species remains in the

mountains of northern New Mexico from the lower limit of its breeding range—Hondo Canyon, 8,000 feet, and Arroyo Seco, 8,000 feet (Surber), down to Las Vegas, 6,400 feet (Batchelder), Cieneguilla, 6,000 feet (Surber), and in the Guadalupe Mountains above 4,000 feet where it was rather common in January 1915 (Willet). In 1892, it was noted along the southern boundary of the State until April 18 (Mearns), and in 1890 until April 15 at Carlisle (Barrell).

The last edition, 1910, of the American Ornithologists' Union Check-List of North American Birds gives *caniceps* and *dorsalis*, both as subspecies of *Junco phaeonotus*. During June, 1909, both forms were found breeding together on Bear Ridge in the Zuni Mountains (Goldman), and the specimens collected are in each case typical of the form *caniceps*, finding here its southwestern limit and *dorsalis*, its northwestern. It is evident therefore that these two forms are not subspecies of the same parent stock.—W. W. COOKE.

GENERAL HABITS.—In the Sangre de Cristo Mountains, in 1903, Gray-headed Juncos were the commonest birds, and the only juncos seen, although we watched carefully for the Red-backed. Nests were found throughout the open. Near our Jack Creek camp at about 11,000 feet, ten nests or families of young were found between July 22 and August 15. All of the nests found were on the ground, underneath and completely hidden by, tufts of grass or bunches of weeds, and were discovered only by flushing the brooding bird. Among the insects fed to the young birds were a caddice fly and a green caterpillar.

The Gray-headed was the one abundant bird of the Gallinas Mountains in early October, 1904, after a cold storm when snow fell on the peak above us. There must have been hundreds about camp. They were everywhere but especially abundant in the weed patches on the edge of the scrub oak thickets into which they flew when flushed, and the stomachs of two taken were full of seeds, including a large per cent of pigweed. In the large flocks of gray-headed, now and then one of the black-headed juncos was seen.

ADDITIONAL LITERATURE.—ROCKWELL, R. B., Condor, XII, 164-165, 1910 (nest).

WESTERN TREE SPARROW: *Spizella monticola ochracea* Brewster

DESCRIPTION.—*Male*: Length (skins) 5.6-6 inches, wing 2.9-3.2, tail 2.6-2.9, bill .4. *Female*: Length (skins) 5.4-5.7 inches, wing 2.9-3.1, tail 2.6-2.7, bill .3-.4. Tail long, broad-feathered. *Adults*: Crown and postocular streak cinnamon-rufous bordered by broad superciliary stripes, back pale buffy streaked with black and rusty, tail with pale edgings, wings with two conspicuous white bars; underparts grayish, chest with small dusky spot (sometimes barely seen), and sides of chest brown; upper mandible blackish, lower yellow. (In winter general coloration more buffy, especially above, and crown with rufous and ashy median stripe obscured by grayish edgings.) *Young*: Heavily streaked below.

COMPARISONS.—See Worthen Sparrow, Comparisons, p. 749.

RANGE.—Breeds from coast of Bering Sea east to Anderson River and south in mountains to northern British Columbia; winters in southern British Columbia, Oregon, Wyoming, Colorado, Utah, Arizona, New Mexico, central Texas, and east to South Dakota and Kansas; casual in Washington and reported from California.

STATE RECORDS.—From its far Canadian breeding grounds, the Western Tree Sparrow comes south and occurs in New Mexico during the winter. It is one of the latest migrants and although seen at Corona, October 10-25, 1902 (Gaut), rarely reaches the State before the middle of November. It was seen at Aztec, December 3-9, 1893, and Albuquerque, January 11, 1894 (Loring); 25 were seen at Albuquerque, December 25, 1902; the first flock was seen at Currumpa, January 17, 1894, and other



Copyright by H. & E. Pittman

FIG. 127. Western Tree Sparrow
On a leafless tree in winter

flocks two days later (Seton); it is common at Shiprock (Gilman), and extends its range at least as far south as Las Vegas, December, 1882 (Batchelder), and Albuquerque November 18, 1900 (Birtwell).

It remains in the State only a short time, returning northward in March. It was noted at Las Vegas to March 17, 1902 (Atkins).—W. W. COOKE.

GENERAL HABITS.—In the Kotzebue Sound region of Alaska, Doctor Grinnell found the Western Tree Sparrow along brush-bordered timber tracts and in patches of stunted willows and alders back among the hills, where there were full-fledged young and molting adults the latter part of July. The song, he says, reminded him strongly of that of the Lazuli Bunting (1900, pp. 51-52).

In northeastern New Mexico, at Currumpa, in winter, Ernest Thompson Seton found flocks about a ranch and in sheltered ravines (MS).

WESTERN CHIPPING SPARROW: *Spizella passerina arizonae* Coues

DESCRIPTION.—*Male:* Length (skins) 4.8-5.4 inches, wing 2.6-3, tail 2.1-2.6, bill .4. *Female:* Length (skins) 4.9-5.3 inches, wing 2.6-3, tail 2.1-2.4, bill .3-.4. *Adults in summer:* Crown reddish brown, forehead blackish, cut by median white line; line over eye white or grayish, line back of eye, black; back brownish or pale buffy, streaked with black, rump and upper tail coverts gray, tail dusky; wing with a more or less distinct white or buffy band; underparts white or grayish; bill black. *Adults in winter:* Similar to summer adults but colors duller and less sharply contrasted, the chestnut of crown partly obscured by buffy tips to feathers, the bill brownish. *Young:* Crown with reddish brown, streaked; line over eye, buffy, streaked; breast and sides streaked.

COMPARISONS.—The absence of pectoral blotch and striking wing bars distinguish the Western Chipping from the Western Tree Sparrow (see p. 743), and the black forehead and eye streak distinguish it from the Worthen Sparrow (see p. 749).

RANGE.—Breeds in Canadian, Transition, and Upper Sonoran Zones from Yukon, Mackenzie, and northeastern Alberta east to eastern Colorado, western Kansas, and south to Chihuahua and northern Lower California; winters from southern California, southern Arizona, New Mexico (rarely), and central Texas south to Puebla, Oaxaca, Michoacan, and Cape San Lucas.

STATE RECORDS.—One of the commonest breeding birds in the State, the Western Chipping Sparrow occurs in summer over much of New Mexico east to Las Vegas (Mitchell), Montoya (Bailey), Cloudcroft (Green), and the Guadalupe Mountains (Bailey). It breeds as low as 4,700 feet near Montoya (Bailey), 5,000 feet at Shiprock (Gilman), and at 6,000 feet near Silver City (Marsh). [At 6,200 feet, Chloride, small young were found in a nest, June 13, 1916, and two days later fresh eggs in a nest, while at Mount Taylor, about 8,000 feet, July 25, 1916, young were common, flying about (Ligon). It was abundant in northern Santa Fe County, nesting up to 8,500 feet (Jensen, 1922).] Though most common as a breeder from 6,000 to 8,000 feet, yet it seems to nest up to 11,000 feet near Pecos Baldy, on Jack Creek, where young still being fed were found, July 23, 1903 (Bailey). [During June and July, 1919, great numbers were met with in the mountainous country of the head of the Pecos and of the Little Rio Grande. They were common about Taos at an elevation of about 7,300 feet and from that to around timberline. It is one of the commonest birds of the Sangre de Cristo Mountains (Ligon).]

In the fall migration, or in summer, after the young are well grown, the Chipping Sparrow ascends to timberline, and was noted August 11, 1903, at 12,300 feet on



From Handbook (Fuentes)

FIG. 128. Western Chipping Sparrow

Truchas Peak. In 1904 on August 20-25, it was found at 10,700 feet in the Costilla Valley, and in 1906 to 10,500 feet on Santa Clara Peak (Bailey).

Although Merrill has seen them at Mesilla Park from October to May, most of them leave New Mexico for the winter, the greater number of migrants departing early in October. [Four were noted October 1, 1916, at White Water Creek (Skinner).] Some late dates are October 9, 1905, Datil Mountains (Hollister); October 8, 1903, Manzano Mountains (Gaut); October 9, 1906, near Gallo Spring a few miles northwest of Old Fort Tularosa and the next day at the Fort itself (Bailey); July 28-October 24, 1913, along the foothills and Red River, Colfax County (Kalmbach). An unusually late bird was seen, November 10, 1906, near Silver City (Bailey).

In spring they return early, and were first seen at Mesilla Park, February 27, 1903 (Ford); at Fort Webster March 4 (Henry); at Silver City March 8, 1884 (Marsh); at Chloride April 3, 1915 (Ligon), and at Pecos, April 25, 1900 (Birtwell).—W. W. COOKE.

NEST.—In trees or bushes; made of small sticks and dried grass stems and lined with horsehair, cow hair, or rootlets. *Eggs*: 3 to 5, light greenish blue, speckled chiefly around the larger end with black and brown.

FOOD.—Animal matter, consisting of insects and an occasional spider, 38 per cent; vegetable matter, 62 per cent. Only 1 per cent of the insect food consists of useful insects, while more than 25 per cent is made up of insect pests including cankerworms, brown-tail moth, tent, and gipsy caterpillars, army worms, forest tent caterpillars, cabbage worms, pea lice, leaf beetles, alfalfa weevils, and grasshoppers. [From July 28 to October 24, in Colfax County, 39 per cent was grasshoppers (Kalmbach).] Of its vegetable food only 4 per cent is grain (largely stubble field oats), while 40 per cent is weed seed, including such pests as crab grass and ragweed.

GENERAL HABITS.—Near Santa Rosa, a Western Chipping Sparrow that I found on her nest in a juniper about six feet from the ground was so tame, or so brave, that she would not leave, although in trying to make sure of her white superciliary and rufous cap I had to move the branches around her. Near Glorieta we found a nest in a bushy cottonwood, and two other nests, found by Mr. Bailey at the head of the Rio Mimbres, were about two feet from the ground in pine and juniper respectively, made of rootlets as well as grass, with the usual hair lining.

At 11,000 feet near Pecos Baldy on August 3, 1903, wanderers or migrants were common in the mountain meadows, and on August 11, when several were seen at timberline on Truchas at 12,300 feet, they were in company with Arctic Bluebirds and Red-shafted Flickers. On the Jicarilla Apache Reservation in September the Chipping Sparrows were frequently flushed in driving among the scrub oaks or through the open yellow pine parks. But, while they are encountered at various times of the year in the wooded hills and even at remote timberline, they readily fall into the familiar ways of the eastern bird, making themselves at home in gardens and orchards. Wherever found their monotonous but contented trill easily places them.

In addition to this song and their usual call note, a thin *chip*, they have—in common with other birds which migrate at night—a note

FINCHES, SPARROWS, ETC.: CLAY-COLORED SPARROW 747

which Mr. W. M. Tyler calls their migration call note and which he says is used only when flocking and probably serves to maintain the unity of the flock (1916, p. 134).

CLAY-COLORED SPARROW: *Spizella pallida* (Swainson)

DESCRIPTION.—*Male*: Length (skins) 4.6–5.4 inches, wing 2.3–2.5, tail 2.2–2.4, bill .3–.4. *Female*: Length (skins) 4.6–5.2 inches, wing 2.3–2.5, tail 2–2.4, bill .3–.4. *Adults in summer*: Crown light brown striped with black, *median stripe gray or buffy grayish*, line over eye pronounced *white or buffy*, ear patch buffy brown with enclosing black marks *strongly contrasted*; hind neck *gray*, unstreaked, back and scapulars brown, broadly streaked with black; wing bars buffy; underparts whitish, tinged with buffy on chest and sides; bill brown with dusky tip, paler below, legs and feet pale brownish. *Adults in winter*: Similar to summer plumage but crown streaks narrower and plumage more tinged with buffy. *Young*: Upperparts buffy or clay-colored, chest and sides buffy, streaked with black.

COMPARISONS.—In some fall and winter specimens the Clay-colored and Brewer Sparrows are distinguished with difficulty.

RANGE.—Great Plains region. Breeds in Canadian and Transition Zones from southeastern Mackenzie, eastern Montana, Manitoba, and Ontario south to Michigan, Illinois, Nebraska, and eastern Colorado; winters south to Cape San Lucas, Lower California, Guanajuato, Puebla, Oaxaca, and Chiapas. Recorded from Cariboo District, British Columbia.

STATE RECORDS.—As it breeds abundantly to the north of New Mexico and is known to breed commonly in southeastern Colorado within a few miles of the New Mexico line, there is every reason to believe that eventually the Clay-colored Sparrow will be found breeding in New Mexico, but as yet it is known there only in migration. It enters the State in August and was common the last few days of that month in 1903 near Las Vegas. By September 3, 1901, it had reached the southern part of the State at Carlsbad; it is most common in September and ranges in fall migration at least to 8,000 feet at Black Lake (Bailey). It was still common near Santa Rosa early in October (Gaut), but was not recorded at a later date.

In the spring migration it appeared near Gage, 20 miles west of Deming, April 17, 1885 (Mearns), and was still common May 6, 1910, near Santa Rosa (Lantz and Piper).—W. W. COOKE.

NEST.—In bushes, in open situations; made of grass stems lined with horsehair. *Eggs*: Usually 4, light greenish blue, lightly spotted around the larger end with brown.

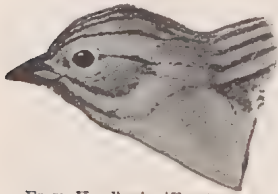
GENERAL HABITS.—The Clay-colored Sparrow, whose head stripes show when it raises its crown, is commonly seen on the low oak ridges of Minnesota and in the aromatic silver-leaf patches of North Dakota, where its hoarse rasping *ka-kah-kah-kah-kah* has a grateful tang, and coming from a number of its clan makes a pleasant leisurely chorus.

BREWER SPARROW: *Spizella breweri* Cassin

DESCRIPTION.—*Male*: Length (skins) 4.7–5.1 inches, wing 2.4–2.6, tail 2.3–2.4, bill .3. *Female*: Length (skins) 4.6–5.2 inches, wing 2.2–2.6, tail 2.3–2.5, bill .3–.4. *Adults*: Entire upperparts pale brown, streaked with black; underparts whitish. In fall and winter, similar but more buffy. *Young*: Like adults but less sharply streaked above, wings with two buffy bands, and chest streaked.

COMPARISONS.—Typical summer specimens of the Brewer differ from the Clay-colored Sparrow in being more narrowly, *uniformly and continuously streaked above*, especially on the head, which lacks the median crown stripe, and the plain gray hind-neck. The cheek patches are also less strongly contrasted. (See p. 747.)

RANGE.—Breeds mainly in arid Transition Zone from southern British Columbia, west-central Alberta, eastern Montana, and northwestern Nebraska south to New Mexico, Arizona, and eastern California; winters from California, southern Arizona, and Texas south through Lower California and western border of Mexican tablelands to Jalisco.



From Handbook (Fuertes)

FIG. 129. Brewer Sparrow

STATE RECORDS.—When Doctor Coues visited New Mexico in 1864 he found the Brewer Sparrow breeding near Fort Wingate; forty years later specimens were collected at Wingate and Gallup, June 19–July 6, 1905, and it was declared to be “the most common breeding bird in the Puerco valley” (Hollister). [At Lake Burford, May 23–June 19, 1918, it was found to be one of the most common breeding birds, and a number of nests were found—one on June 4 with three eggs, and one, June 17, with three newly hatched young (Wetmore). It is locally abundant in northern Santa Fe County. North and west of the Santa Fe Indian School for about 3 miles it nests in large numbers in sagebrush and low junipers (Jensen, 1922).] A specimen was taken at Santa Fe, July 17, 1874 (Henshaw). It is a common breeding bird of the San Luis Valley, Colorado, and is rather common in the sagebrush of the northwestern quarter of New Mexico (Ligon).

It was common July 28–October 24, 1913, along the foothills and Red River, Colfax County (Kalmbach). Both young and old were common, July 31, 1904, at Tres Piedras, 8,000 feet (Gaut), and the species becomes common in August, east to Las Vegas (Bailey), Fort Sumner, and to the Sacramento and White Mountains. By September 4, 1908, it had reached the southern part of the State at Deming. It was common on the mesas and grassy flats from Laguna to the base of the Bear Spring Mountains during the latter part of September, 1905 (Hollister). It remains common through September, but most leave soon after the last of this month. Several belated individuals were seen at Cactus Flat as late as November 6, 1906 (Bailey).

Merrill has recorded them from Mesilla Park as seen commonly from August to May, or June 1, so some remain in the State during the winter. A specimen was taken at El Paso, Texas, close to the New Mexico line, February 6, 1892 (Mearns).

In the spring, along the border, it was common through March and to April 18, 1892 (Mearns). It was noted at Rinconada, April 18, 1904 (Surber), and it remained at Silver City until May 10, 1906 (Bailey); [a specimen was taken there, May 13, 1917 (Kellogg),] and May 12, 1884 (Marsh). Three were seen near Santa Rosa, May 15, 1910 (Lantz and Piper), and one at Mesilla Park, May 1, 1904 (Metcalf).—W. W. COOKE.

NEST.—In sagebrush, low junipers, and sometimes vineyards; made compactly of shredded sage bark or light dead twigs, fine grass stems, and leaves, lined with rootlets, long horsehairs, or sometimes cow hair, weed seed, and rabbit fur. Eggs: Usually 3 or 4, greenish with a wreath of reddish brown spots around the larger end.

FOOD.—In the summer months upward of 90 per cent of its food consists of injurious insects and weed seeds (July 28–October 24, 1913, in Colfax County, 24 per cent grasshoppers (Kalmbach), and it is one of the most effective enemies of the alfalfa weevil. It also eats equally injurious plant lice and caterpillars.

GENERAL HABITS.—The small, striped Brewer Sparrow is so characteristically a bird of the sagebrush as to merit the name of Sagebrush Chippy. But it has recently been recorded as coming into the vineyards of southern California, and where alfalfa has been introduced in its region, like others of its relatives, it has learned that it can find an abundant supply of insects in the alfalfa fields. Its range is practically coincident with that of the sagebrush, which it follows to its upper limit. In Nevada, Doctor Taylor found it ranging from 4,100–9,000 feet (1912, p. 393). In the "extensive sage grown areas" at Lake Burford, in 1918, Doctor Wetmore found it one of the commonest breeding birds.

In northern Nevada, Doctor Taylor found it by far the most abundant bird of the region, and the thicker the sage the more in evidence it was. During the latter part of May and the first of June, it was "a most enthusiastic songster" and was heard before three o'clock in the morning and after eight o'clock at night. It was often seen "flying irregularly into the air to a height of fifteen feet or more and then shooting straight down and coming to rest in a sagebush" (1912, p. 394). When flushed it would make a zigzag flight toward a fairly distant bush, sinking to the ground behind it but starting up and repeating the performance when nearly overtaken. About the middle of July the appearance of the scores of young ones became noticeable. "Several flocks were observed in willows along a creek, twittering together in a most amicable fashion."

ADDITIONAL LITERATURE.—TYLER, J. G., Condor, XII, 193–195, 1910 (vineyard nests).

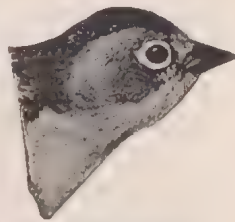
WORTHEN PARROW: *Spizella wortheni* Ridgway

DESCRIPTION.—*Male:* Length (skins) 5 inches, wing 2.6–2.8, tail 2.3–2.5, bill .4. *Female:* Length (skins) 5–5.2 inches, wing 2.5–2.7, tail 2.3–2.5, bill .3–.4. Bill slender. *Adults:* Crown dull cinnamon-brownish, usually narrowly and indistinctly streaked, rest of head including forehead ashy, eye ring white, sides of head gray, back and scapulars pale brown, broadly streaked with black; underparts whitish, shaded with buffy grayish on sides; bill pinkish brown or cinnamon rufous. *Young:* Duller, crown dull brown, chest and sides streaked.

COMPARISONS.—The Worthen Sparrow suggests the Western Chipping Sparrow but lacks the black eye-streak and has a conspicuous white eye-ring. (See p. 745.)

RANGE.—Breeds in Upper Sonoran Zone from Silver City, New Mexico, to Tamaulipas, Mexico; winters south to southern Puebla.

STATE RECORDS.—The type specimen of the Worthen Sparrow was taken, June 16, 1884, by Charles H. Marsh at Silver City, and shortly afterward was described by Ridgway (1884, p. 259). No further specimens have been reported from the State, though the validity of the species has been established by specimens taken in



From Handbook (Fuertes)

FIG. 130. Worthen Sparrow

central and northeastern Mexico. The date of capture of the type would indicate that the bird was breeding where taken. It must be very rare at the type locality, for that neighborhood has been searched industriously for it without success. Judging by the habits of its near relative, the Field Sparrow of the East, it should be non-migratory or only slightly migratory in southern New Mexico.

The type specimen is still in the United States National Museum. The Biological Survey has several specimens taken in Mexico by Nelson and Goldman; one, April 28, 1893, at Chalchicomula, Puebla, and six taken, June 8-9, 1898, at Miquihuana, Tamaulipas.—W. W. COOKE.

BLACK-CHINNED SPARROW: *Spizella atrogularis* (Cabanis)

DESCRIPTION.—*Male:* Length (skins) 4.8-5.5 inches, wing 2.4-2.7, tail 2.4-2.9, bill .3-.4. *Female:* Length (skins) 4.9-5.4 inches, wing 2.4-2.5, tail 2.3-2.7, bill .3-.4. *Adult male:* Lores and throat black, rest of head, neck, and underparts gray, fading to white on belly; back and scapulars rusty brown or cinnamon, narrowly streaked with blackish; tail dusky with pale gray edgings, wing coverts broadly edged with brownish; bill pinkish brown. *Adult female:* Similar to male but usually with black of chin restricted, often wanting. *Young:* Black replaced by gray, streakings on back narrower, chest indistinctly streaked.

RANGE.—Breeds in semi-arid Upper Sonoran Zone in desert and coast ranges of southern California, Arizona, and southern New Mexico to northern Lower California and south over Mexican tableland to Puebla and Michoacan; winters in southern part of breeding range and southern Lower California.

STATE RECORDS.—The Black-chinned Sparrow is a western and southern species, and its extreme northeastern limit is found in New Mexico. It ranges in that State north to Silver City (Marsh), and northeast to the Capitan Mountains. In the Capitan Mountains it was not rare June 14, 1899, and evidently breeding on Mount Capitan in the chaparral at the upper edge of the juniper belt at about 7,000 feet (Bailey). It was seen, May 27, 1884, at Silver City 6,000 feet (Marsh), and July 20, 1908, was found fairly common on Big Hatchet Mountain at 7,000 to 8,000 feet (Goldman); (young were being fed out of the nest, June 26, 1926, on the south slope of the Big Hatchets (Ligon)). It was found a common breeder June, 1913, near Cuchillo at 6,000 feet (Goldman), on the west slope of the San Andres Mountains to 6,000 feet and abundant on the flats west of Tularosa, 4,800 feet (Gaut). The known breeding range extends therefore from 6,000 to 8,000 feet.

In migration, it has been noted at about the same altitudes, October 9, 1889, in the Little Hachita and November 24, 1889, in the Big Hatchet Mountains (Anthony).

It undoubtedly deserts New Mexico during the winter but the dates of departure and of return in the spring have not yet been determined.

NEST.—In sagebrush or other bushes, well concealed, made of grasses lined sometimes with horsehair. *Eggs:* 3 to 5, light greenish blue sometimes sparsely dotted with various shades of brown around the larger end.

GENERAL HABITS.—In the San Jacinto Mountains of California Grinnell and Swarth found the Black-chinned Sparrow common on the north and west slopes, but not on the desert side of the mountains. The unique song was frequently heard from a male perched on the tip of a bush in the vicinity of its nest. The song consists of a short series of high, wiry notes, the first few uttered deliberately and distinctly,

the rest rapidly run together, the whole repeated at irregular intervals, from fifteen seconds to many minutes (1913, pp. 273-275).

HARRIS SPARROW: *Zonotrichia querula* (Nuttall)

DESCRIPTION.—*Male:* Length (skins) 6.5-7.3 inches, wing 3.4-3.6, tail 3.1-3.4, bill .5. *Female:* Length (skins) 6.7-6.9 inches, wing 3.1-3.3, tail 3-3.2, bill .5. *Adults:* Crown, face, throat, and V-shaped breast patch of streaks or spots, black; underparts mainly white, washed with buffy brown on sides and more or less streaked; cheeks gray (buffy brown in winter); upperparts brown, back and scapulars broadly streaked with blackish; wings with two white or buffy white bars; bill brownish pink. *Young in juvenal plumage:* Upperparts blackish, feathers, including wing quills, edged with buffy and brown; tail feathers margined with whitish; sides of head and underparts buffy, malar stripe conspicuous; chest and sides streaked with black; upper throat grayish white (Preble).



Copyright by H. & E. Pittman

FIG. 131. Harris Sparrow

To be carefully looked for in New Mexico in winter

RANGE.—Breeds in Hudsonian Zone from Mackenzie to Hudson Bay; winters from northern Kansas south to southern Texas. Recorded from British Columbia, Ontario, California, Colorado, Michigan, and Illinois.

STATE RECORDS.—On the Rio Grande Bird Reserve, two or three of the Harris Sparrows were seen by George Willett on December 1, 1916, and, as the birds winter in southern Arizona and southern Texas, they may well be looked for carefully in New Mexico.

GENERAL HABITS.—Like other sparrows, Colonel Goss says, the Harris Sparrow frequents "thickets bordering streams and the edges of low woodlands," and are also fond of brush heaps, in all which places they can be easily overlooked (1891, p. 453). Their "chuckling note" and their plaintive whistle, which Mr. Harry Harris describes as querulous and pitched in a minor key similar to that of the White-throat but readily distinguished by the absence of well-marked form, may give a clue to their presence on warm winter days and early spring days before they start north (1919b, p. 298).

The migration of the Harris Sparrow is used by Doctor Wetmore, in his delightful book on *The Migrations of Birds*, as "an excellent example of a species with limited distribution and migration." Nesting from Hudson Bay westward possibly to near Great Bear Lake, it migrates "through a comparatively narrow area along the eastern edge of the Great Plains." Stragglers make their way to Colorado and New Mexico on the west and Wisconsin and Illinois on the east. "But the full migration centers through a narrow region comprising eastern

Kansas and western Missouri. Here this fine bird swarms in thickets and hedgerows during October, and again in April, filling the air with its rollicking whistled calls. At the height of the migration thousands may be seen in a single day, but outside this strip, which is barely two hundred and fifty miles wide, the bird is casual or rare. No other bird has this distribution, which lies along the lines where forms of the eastern half of the country begin to disappear and those of the west to appear" (1926a, pp. 202-203).

ADDITIONAL LITERATURE.—COOKE, W. W., Auk, I, 332-337, 1884.

WHITE-CROWNED SPARROW: *Zonotrichia leucóphrys* (J. R. Forster)

DESCRIPTION.—*Male:* Length (skins) 5.8-6.7 inches, wing 3-3.3, tail 2.7-3.2, bill .4-.5. *Female:* Length (skins) 6-6.6 inches, wing 3-3.2, tail 2.7-3, bill .4-.5. *Adult male:* Head striped, black and white stripes of about equal width; lores black;



From Biological Survey

FIG. 132. White-crowned Sparrow

hind neck gray, back and scapulars gray, broadly streaked with brown, rump and upper tail coverts and tail hair brown, tail with paler edgings; wings with two white bands; underparts gray, darkest on chest, sides and flanks pale buffy brown; bill cinnamon-brown, tip dusky. *Adult female:* Sometimes indistinguishable from male but usually with median crown stripe narrower and partly gray. *Immature:* Similar to adults but head stripes brown and buffy instead of black and white, and underparts more or less buffy. *Young in juvenal plumage:* Lateral crown stripes light brown and median stripe buffy, all streaked with dusky, lores partly brownish; underparts buffy whitish, chest and sides streaked with dusky.

RANGE.—Breeds in Hudsonian and Canadian Zones from limit of trees in central Keewatin, northern Quebec, and southern Greenland south to southern Quebec, Manitoba, southwestern Saskatchewan, southeastern British Columbia,

and in high mountains from northern Oregon to central California, east to northern Montana and south to southern New Mexico; winters from northern Lower California, New Mexico, southern Texas, southern Kansas, and Ohio Valley south to Louisiana and Mississippi, and over Mexican plateau to Guanajuato, Jalisco, and Sinaloa.

STATE RECORDS.—The most southern extension of the breeding range of the White-crowned Sparrow occurs in the high mountains of northern New Mexico. Here, on July 27, 1903, nearly fledged young were found at 11,000 feet near Pecos Baldy on Jack Creek. The old birds were common in the willows at 11,600 feet at the foot of Pecos Baldy and were singing up to timberline at over 12,000 feet.

They were seen carrying food from July 23 to August 8. The next year in the Wheeler Peak amphitheater of the Taos Mountains a nest containing young was found, July 20, at 11,400 feet, near timberline (Bailey). [About 25 miles southeast of Taos, at 10,500 feet, several birds were singing June 24, 1919. Others were noted in the region. At timberline in the Pecos Mountains numbers were found July 12, 1919, the males singing, and on July 17 a young one was seen. On June 19 and 20, 1924, they were common at timberline on Wheeler and other peaks, nesting in the thick, gnarled, fox-tail pine (a nest with two eggs was found on the southeast slope of Wheeler Peak, June 19, 1924). They were also observed in willow thickets at lower levels (Ligon). In northern Santa Fe County they are common in the spring and have been seen as late as July 1, in willow thickets near the Santa Fe River (Jensen, 1922).] These are apparently the only breeding records for New Mexico and mark the White-crowned Sparrow as one of the highest breeding birds in the State.

After the breeding season, on the east slope of the Taos Mountains, September 17, 1904, they were still common in the meadows at 11,000 feet (Bailey), but the first of the fall migrants appeared, September 18, 1905, near Burley (Hollister); September 19, 1906, near Laguna (Bailey); and September 27, 1915, at Chloride (Ligon). These were undoubtedly birds that had nested much farther north, while those seen September 8, 1904, at 10,000 feet in the San Juan Mountains near Hopewell (Gaut) may have nested in those mountains, and the same is probably true of the birds that were abundant August 20, 1904, at and above timberline in the Culebra Mountains (Bailey). [They were noted near Gallup, September 30, 1916 (Skinner).] By the end of September the species has become common in the lower mountains and all through October is abundant, arriving at Cooney, October 9, 1889 (Barrell), and being common along Red River, Colfax County, October 16, 1913 (Kalmbach).

During the winter it descends to the low valleys as at Shiprock (Gilman), and Fort Thorn (Henry); it was very abundant, December 7-10, 1915, at the south end of the San Mateo Mountains (Ligon), and also remains on the lower mountain slopes.

The spring migration is largely concluded in May, and all the individuals have ordinarily left the lower valleys by the last of that month; one was noted at Chloride, May 8, 1915 (Ligon), but in 1907, following a phenomenally cold spring, one was still present at Deming the first of June; in 1899 several were seen near Roswell at the very late date of June 10-11 (Bailey), and in 1913 one was noted, June 7, at 6,600 feet on the East Gila River (Ligon). [At Lake Burford migrants were seen from May 28 to June 6, 1918 (Wetmore).]—W. W. COOKE.

NEST.—On or near the ground, in sub-alpine meadows, often in willows along streams; made usually of fine twigs, rootlets, grasses, and sometimes horsehairs. *Eggs*: 3 to 5, pale greenish blue, varying to brownish, spotted with reddish brown.

FOOD.—“Like most of its family, it is a seed eater by preference, and insects comprise very little more than 7 per cent of its diet. Caterpillars are the largest item, with some beetles [alfalfa weevils], a few ants and wasps, and some bugs, among which are black olive scales. The great bulk of the food, however, consists of weed seeds, which amount to 74 per cent of the whole. The little fruit it eats is mostly wild, and the grain eaten is waste or volunteer” (Henshaw).

GENERAL HABITS.—When listening to Western Mockingbirds, June 2, 1907, in the mesquite on the edge of Deming, we were astonished to hear the song of the White-crown or “Striped-head,” as the Indians

call it, heard last in timberline willows high in the mountains. The explanation was simple, however, for the season was said to be phenomenally cold and there had been a killing frost only two weeks previous. With these conditions in the valley country, the mountains above would hardly attract their normal population.

In the Pecos Mountains, where we found a family of White-crowns in the willows along Jack Creek, at 11,000 feet, the parents showed much solicitude near the nest. When perched conspicuously high on the willows, as if to attract attention to him, the guardian's crest was raised and the median white stripe widened strikingly, but, when creeping about in the weeds near the nest, the crest was flat and the black and white lines of about equal width. While feeding young in early August, a parent was molting, which seemed good economy of time. At the foot of Pecos Baldy, where Mr. Ligon once camped, he was "wakened at daylight by the White-crown's joyous notes," and its beautiful songs were heard by us up to timberline.

In the amphitheater of Wheeler or Taos Peak, at 11,400 feet, where we found a nest in a low spruce, the White-crowns were singing in the willows. They would fly down to the lake in the bottom of the amphitheater for caddice flies, which were just coming out of their cases on the sides of stones along the water's edge. When not picking the flies off the rocks, the birds would fly up into the air for them. Indeed, in other parts of the amphitheater, they were constantly jumping up into the air and chasing after insects; for the young even of seed eaters must have insect food.

Two months later, on the Santa Clara River near Espanola, October 17, 1904, when the weather was cold and cloudy with a strong wind blowing, Mr. Gaut found the sparrows seeking protection in the dense rabbit brush (*Bigelovia*) along an irrigating ditch, where they probably intended spending the night. He had also found them very numerous in the brushy spots along the canyons on the east side of the Manzano Mountains during the late fall of 1903, where in the middle of the day many of the little fellows would congregate about the mountain springs.

In the season of song the White-crown, one of the handsomest of the sparrows, is among the most notable birds of the mountains, associated as it is with cool, lush, forest-encircled mountain meadows, or with wide timberline views. Its song has been well described by Mr. Silloway as a "plaintive, wildwood melody, *wir, dee-dle dee, dee dee* the first syllable . . . long drawn out, and the *dee-dle dee* following remarkably sweet and liquid, vibrant and tinkling with mellowest silvery tone; the closing syllables more hurried and obscured" (1907, p. 53). Sometimes the first phrase suggests "high on the mountains" (then softly as if in meditative echo) "the mountains."

GAMBEL SPARROW: *Zonotrichia gambeli* (Nuttall)

DESCRIPTION.—*Male*: Length (skins) 5.8–6.5 inches, wing 3–3.3, tail 2.6–2.9, bill .4. *Female*: Length (skins) 5.7–6.4 inches, wing 2.9–3.2, tail 2.6–2.9, bill .4. Similar to the White-crowned Sparrow but lores without black, *white line over eye extending to bill*. (See p. 752; Fig. 132.)

RANGE.—Breeds in Boreal Zones from limit of trees in northwestern Alaska and northern Mackenzie (rarely outside the mountains south of Great Slave Lake) south to Montana, Oregon, and coast mountains of southwestern Alaska; winters in southern British Columbia, Oregon, California, Utah, Arizona and southern Texas south to San Luis Potosi, Mazatlan, Lower California, and outlying islands; casual eastward in migration to Texas, Kansas, Iowa, and Minnesota.

STATE RECORDS.—The Gambel Sparrow is a relative of the White-crowned Sparrow and represents those individuals that breed far north in the western part of North America from about central Montana, north to Alaska and northern Mackenzie. Though nesting so far north, migrants of this form enter New Mexico not much later in the fall than the migrants of *leucophrys*, that have come only from Colorado. They come to Mesilla Park in vast numbers about September and stay till early May, Merrill says. [A specimen was taken, November 3, 1916, at Silver City (Kellogg); it was abundant, November 23–December 9, 1916, on the Rio Grande Bird Reserve (Elephant Butte); it was noted in the winter of 1915–16, and was abundant in December, 1916, on the Carlsbad Bird Reserve (Willett).] Exact information is lacking as to the relative numbers of the two forms in New Mexico during the winter, at which season both are common, but it seems probable that *gambeli* is the more abundant. This species not only descends to the low valleys as at Carlsbad (Willett), and Fort Thorn (Henry), but is also found at Albuquerque, 5,000 feet, December 25, 1902 (Harman), and was reported from Fort Bayard, 6,040 feet, January 2, 1908 (Rockhill), Las Vegas Hot Springs, 6,700 feet, December 12, 1882 (Batchelder), and well up in the mountains, where it was taken February 8, 1904, at 8,000 feet near Arroyo Seco (Surber).

There is no doubt but that *gambeli* moves north in the spring earlier than *leucophrys* and the birds taken, May 1, 1904, at Rinconada (Surber), and noted, May 15, 1915, at State College (Merrill), probably represent nearly its final departure from the State.—W. W. COOKE.

GENERAL HABITS.—*Zonotrichias*, largely in immature plumage, were singing everywhere in the weeds of the river valley at Glenwood early in November, 1906, and one shot proved to be *gambeli*.

At Blanco, Mr. Birdseye found them "everywhere abundant in the cottonwoods, willows, *Bigelovia*, and other brush. Several were caught in mouse traps baited with wheat, oats, and oatmeal, November 15 to 20, 1908" (MS).

They were also abundant in thickets in and about fields at Garfield, the middle of November, 1909. Whole flocks were sometimes seen by Major Goldman, the birds sitting quietly or chattering in low tones,



From Handbook of Western Birds
FIG. 133. Gambel Sparrow

sunning themselves in leafless *Rhus* bushes along the river. Doctor Henry reported their eating mistletoe berries.

WHITE-THROATED SPARROW: *Zonotrichia albicollis* (Gmelin)

DESCRIPTION.—*Male:* Length (skins) 6.1–6.6 inches, wing 2.8–3, tail 2.8–3, bill .4–.5. *Female:* Length (skins), 5.9–6.3 inches, wing 2.7–2.9, tail 2.7–2.9, bill .4–.5. *Adults in summer:* Head striped with black and white, median white stripe narrow; broad superciliary, yellow from bill to above eye; back and scapulars rusty brown, streaked with black; wings with two white bands and pale yellow edge; throat patch white, conspicuous against adjoining gray; median underparts white, sides brownish; bill bluish gray below. *Immature, and adults in winter:* Crown stripes brown and buffy instead of white and black; yellow duller; throat patch less sharply defined and in some immature specimens practically obsolete, when the breast is obscurely streaked.

RANGE.—Breeds in Canadian and Hudsonian Zones from northern Mackenzie, central Keewatin, and Quebec south to Maine, southern Ontario (in mountains to Massachusetts, New York, and Pennsylvania), Minnesota, and central Alberta; winters from Missouri, Ohio Valley, Pennsylvania, Connecticut, and Massachusetts south to Florida, southern Texas (rarely), northeastern Mexico, and California (rarely); casual in Montana, Utah, Colorado, and New Mexico. Recorded from British Columbia, Washington, Oregon, and Wyoming.

STATE RECORDS.—The White-throated Sparrow of the eastern states has been recorded by Willett from the Rio Grande Bird Reserve (Elephant Butte), where it was noted from November 23 to December 9, 1916.

GENERAL HABITS.—Like the other black and white-crowned sparrows the White-throat frequents weed patches and brushy thickets. When not seen near enough to recognize it by its white throat patch, its clearly whistled *I-I*, *Peá-body*, *Peá-body* readily identifies it, and although it may not be in good voice in winter, when if ever, it may be found in New Mexico, its notes are distinctive. One of its calls is a peculiar “quarrying note,” as of a slipping chisel.

ROCKY MOUNTAIN SONG SPARROW: *Melospiza melodia fallax* (Baird)

DESCRIPTION.—*Male:* Length (skins) 5.6–6.5 inches, wing 2.6–2.9, tail 2.5–3, bill .4–.5. *Female:* Length (skins) 5.3–6.3 inches, wing 2.5–2.7, tail 2.5–2.9, bill .4–.5. Bill moderate, conic, wings short and much rounded, tail long, much rounded, with broad feathers, feet moderately stout. *Adults:* Crown brown narrowly streaked with black, having a narrow gray median stripe and bordered by a grayish line over eye; upperparts umber-brown with gray margins to feathers giving a strong grayish cast; back and scapulars streaked with blackish brown; tail and wings brown, middle tail feathers with narrow dusky streak; wings with brown coverts and grayish edgings; underparts white, chest and sides streaked with blackish brown more or less confluent on breast. *Young:* Like adults but duller, ground color of underparts whitish.

RANGE.—Breeds in Upper Sonoran and Transition Zones of Rocky Mountains and eastern Great Basin region, from northeastern Oregon to western Montana south to northern New Mexico and Nevada; winters from Montana south to southeastern California (sparingly), Arizona, western Texas, Chihuahua, and Sonora. Casual in Washington.

STATE RECORDS.—Two immature Mountain Song Sparrows, so young that they had evidently been hatched not far distant, were taken, August 13, 1904, at 7,600 feet on Arroyo Hondo (Bailey). The species is evidently not common, for none had been seen or heard during the previous month spent in working from the base to the summits of the Tao Mountains. [They were observed at Taos, June 21, 1924 (Ligon). A few pairs have been found nesting in the willows along the river between Santa Fe and the Reservoir at the mouth of the canyon. On June 19, 1921, a nest was found with four fresh eggs (Jensen). At Lake Burford they were common, May 23–June 19, 1918, and it was estimated that 35 pairs were nesting around the lake. After June 4, the young were common (Wetmore).]

In most of New Mexico it is known only as a migrant and winter resident. In the fall it was common, August 23, 1904, at 9,700 feet on the Costilla River (Bailey), and was still more common, October 7–12, 1908, near the summit of the Chuska Mountains at 8,500 feet, and was fairly common at Blanco in brush along the river, November 15–20, 1908 (Birdseye). In 1913 it was fairly common at Lake Burford on August 2, and in 1905 had already appeared in the Jornada, September 1, and by the end of the month it was seen in full numbers (Ligon).

Before winter, it passes across the entire State and comes into the valleys of the southern part, but remains at least as high as 6,400 feet at Las Vegas, December 18, 1882 (Batchelder). [On the Rio Grande Bird Reserve (Elephant Butte), it was common, November 23–December 9, 1916. On the Carlsbad Bird Reserve it was seen occasionally in January, 1915, noted during the winter of 1915–16, and found common, in December, 1916 (Willett).]

In the spring of 1903, it remained at Mesilla Park until March 20 (Ford), and the next year at Cieneguilla, 6,000 feet, until March 21 (Surber).—W. W. COOKE.

NEST.—In low bushes, vines, or on the ground, usually near water, made chiefly of grasses lined with slender stems and sometimes horsehair. Eggs: 4 or 5, dull greenish white, spotted with reddish brown, sometimes concealing ground color.

FOOD.—(Song Sparrows of various subspecies.) Of the total food for the year, animal matter constitutes 34 per cent, and vegetable, 66 per cent; but from May to August, insects amount to about half of the food, including larval and imago mosquito-like flies and horseflies, ants, larvae of cutworms, army worms, cankerworms,



From Biological Survey

FIG. 134. Song Sparrow
Singing his sweet song of home

leaf beetles, and weevils. Of the vegetable food of the year 3 per cent consists of ragweed, 4 per cent grain (largely waste), 16 per cent polygonum (weed pests), and related seeds, 24 per cent grass seed and crab grass (more than half pigeon and crab grass), and 18 per cent miscellaneous seeds, such as wild sunflower, amaranth, lambs' quarters, dandelion, dock, and sheep sorrel, 8 per cent berries (mainly wild and eaten in July before the weed seed is ripe). Taking its food as a whole it does much more good than harm. "Only 2 per cent of the food consists of useful insects, while 18 per cent is composed of injurious insects; grain, largely waste, amounts to only 4 per cent, while the seeds of various species of weeds constitute 50 per cent" (Judd).

GENERAL HABITS.—Song Sparrows in general like to live near water and at Lake Burford in 1918, Doctor Wetmore found the Mountain Song Sparrows mainly inhabiting the fringing clumps and growths of dead tules (*Scirpus occidentalis*) along the lakes, only venturing up into the sagebrush to feed and occasionally to nest. When visiting the lake, October 2, 1904, we secured two specimens in fresh fall plumage, although a few of their tail feathers were abraded.

The Song Sparrow was not seen or heard in the Taos Mountains the summer of 1904 until we reached the Hondo Valley, August 11, when its familiar chirp and sweet song were heard in the thickets bordering the Hondo River.

In inhabited regions it is one of the familiar dooryard birds, where it more than repays the proffer of drinking and bathing bowls by its gentle friendliness and its sweet rich song, full of home happiness.

ADDITIONAL LITERATURE.—PEARSON, T. G., Educational Leaflet 31, Nat. Assoc. Audubon Soc.—RUST, H. J., Condor, XIX, 34, 1917 (nest).—WHEELER, W. C., and J. T. NICHOLS, Auk, XLI, 444-451, 1924.

MERRILL SONG SPARROW: *Melospiza melodia merrilli* Brewster

DESCRIPTION.—*Male*: Length (skins) 5.6-6.4 inches, wing 2.6-2.7, tail 2.5-2.8, bill .4-.5. *Female*: Length (skins) 5.5-6.2 inches, wing 2.5-2.7, tail 2.4-2.8, bill .4-.5.

Like the Mountain Song Sparrow but darker and more uniform above, the gray and brown of the back less strongly contrasted.

RANGE.—Breeds in eastern Washington, Oregon, Idaho, northwestern Montana, and Wyoming; winters south to northern California (east of humid coast belt), Nevada, Utah, Arizona, and Sonora.

STATE RECORDS.—A single specimen of the Merrill Song Sparrow was taken by Charles F. Batchelder at Las Vegas Hot Springs on December 15, 1882.

LINCOLN SPARROW: *Melospiza lincolni lincolni* (Audubon)

DESCRIPTION.—*Male*: Length (skins) 4.9-5.8 inches, wing 2.3-2.6, tail 2.1-2.4, bill .4-.5. *Female*: Length (skins) 4.5-5.4 inches, wing 2.1-2.4, tail 2-2.3. *Adults*: Top of head brown, streaked with black and with olive-grayish median stripe; upperparts light olive or buffy olive sharply streaked with black, the streaks widest on back; wings marked with rusty brown and black, tail light grayish brown, middle feathers with median dusky stripe; superciliary stripe and sides of neck, grayish, underparts with broad buffy chest band, finely streaked with black; buffy extending variably over sides of body, neck, and under tail coverts; rest of underparts white.

Young: Essentially like adults but rather more buffy, colors more suffused and markings less sharply defined.

RANGE.—Breeds in Boreal Zones from Kowak and Yukon Rivers, southern Mackenzie, central Keewatin, and northern Quebec south to Nova Scotia, New Brunswick, central Ontario, and northern Minnesota, and in Rocky Mountains, Cascades, and Sierra Nevada south to northern New Mexico and southern California; winters from the San Joaquin Valley, California (probably), Arizona, southern Texas, and northern Mississippi to Guatemala; casual southeast of Alleghenies.

STATE RECORDS.—The southernmost extension of the breeding range of the Lincoln Sparrow in the Rocky Mountains is found in the Sangre de Cristo Mountains of northern New Mexico. Here in 1903 it was found breeding, July 29, at 11,000 feet on Jack Creek near Pecos Baldy, and at 11,600 feet at the foot of Pecos Baldy (Bailey). In 1904, in the Sangre de Cristos above Taos, the breeding range was found to be equally high, the bird being found in the willow meadows at 10,700–11,400 feet. [It was noted in June, 1919, at several points in the Sangre de Cristos; June 25, a breeding male was taken on Pot Creek, southeast of Taos at 9,500 feet. June 29, the species was seen on the Santa Barbara at about 11,500 feet (Ligon).]

Over the rest of the State it is a migrant. The first one recorded was as low as 7,800 feet at Willis, September 12, 1883 (Henshaw), and it has been seen at 8,400 feet near Black Lake on September 10, 1903, and 8,800 feet on the east slope of the Sangre de Cristos above Taos, September 18 and 19. It reached Carlsbad, September 17, 1901 (Bailey), was seen at La Jara Lake, September 19, 1904 (Gaut), Horse Lake, September 23, 1904, Lake Burford, September 28–October 2 (Bailey), and was abundant the last week in September, 1908, along the Gila River near Red-rock (Goldman). At Cliff it was seen until November 8, 1906 (Bailey), but in the Rio Grande Valley near Las Palomas was not seen in 1909 after the last of October (Goldman), nor at Albuquerque after October 9, 1900 (Barber).

[In winter on the Rio Grande Bird Reserve (Elephant Butte), one or two were seen November 23–December 9, 1916 (Willet).] It was found in February, at Shiprock (Gilman), where there is a warm brushy river valley where it might well winter, as it remains during that season at higher latitudes farther east. [Several were seen and one taken, May 9, 1920, at San Simon, Hidalgo County (Ligon).]—W. W. COOKE.

NEST.—On the ground, made of grasses, sometimes lined with hair. *Eggs:* 4 or 5, varying from greenish white to brownish white, heavily marked, chiefly in a wreath around the larger end, with chestnut-brown and lavender-gray.

FOOD.—In migration, hibernating alfalfa weevils as well as the clover-root curculio, crane flies, aquatic beetles, and weed seed.

GENERAL HABITS.—In general appearance the Lincoln might be taken for a Song Sparrow, but its finely penciled buffy breast band easily identifies it when seen, and its individual vibrant song when heard. It is an interesting will-o'-the-wisp of the mountain meadows, appearing and disappearing in the rank vegetation and the willow thickets along the clear mountain brooks.

In the mountains above Taos, where it was one of the common birds of the willow meadows the third week in July, its interesting song was heard a great deal. On August 5, the birds were not only still singing, but one was seen giving a flight song above the willows, although nearly grown young were being fed at the time.

From the high tules on the edge of La Jara Lake, a specimen was taken September 19, in fresh fall plumage, its stomach filled with small black insects apparently found at the edge of the water—insects also eaten by a neighboring Marsh Wren.

In the Manzano Mountains in the late fall Mr. Gaut found it very rare, but a few were seen in dense brushy canyons.

McCOWN LONGSPUR: *Rhyncóphanes mccówni* (Lawrence)

DESCRIPTION.—*Male*: Length (skins) 5.3–5.7 inches, wing 3.5–3.7, tail 1.9–2.2, bill .4–.5. *Female*: Length (skins) 5–5.4 inches, wing 3.1–3.4, tail 1.8–2, bill .4–.5. Similar to *Calcarius* but bill turgid, very stout; hind toe and claw less developed. *Adult male in summer*: Crown jet black bordered by white superciliary, back and



FIG. 135. McCown Longspur, skin

scapulars brown, broadly streaked with dusky, rump and long-pointed upper tail coverts grayer, less distinctly streaked, middle tail feathers dusky, edged with lighter; rest of tail feathers white, broadly tipped with dusky (outer pair sometimes wholly white); wing with light edgings, and chestnut patch on coverts;

chest with crescentic black patch, rest of underparts white, deep gray beneath the surface; bill brownish, dusky at tip. *Adult male in winter*: Black areas partly concealed by broad tips to feathers, brown on head, buffy on chest. *Adult female*: Upperparts light buffy brown streaked with blackish, wings dusky with buffy brown wing bar and edgings; tail as in adult male; underparts buffy becoming white on belly. *Young in juvenal plumage*: Head and hind neck streaked, rest of upperparts dusky, with pale buffy margins to feathers giving ringed effect; chest streaked with dusky. *Young in first winter plumage*: Black of crown and breast marked by brown and grayish tips to feathers.

REMARKS.—In flight the blackish markings on the spread tail, from behind suggest, as Mr. Fuertes said, an inverted T.

RANGE.—Breeds mainly in Transition Zone of Great Plains region, from central Alberta, southern Saskatchewan, and eastern Montana south to southwestern Minnesota and northeastern Colorado; winters from eastern Colorado and Kansas south through Texas and Arizona to Durango and northern Sonora. Recorded from British Columbia, Manitoba, Idaho, and Illinois.

STATE RECORDS.—The McCown Longspur is a common winter resident of the plains of southern and eastern New Mexico. A few were noted at the Mescalero Indian Agency as early as September 12, 1902 (Hollister), and the species becomes common in October; in Union County it was abundant at Clayton, October 22 and 23, and Clapham, October 30, 1893 (Seton); it was found at Fort Bayard, October 22, 1873 (Henshaw); Fort Thorne, October 10 (Henry); Apache, October (Anthony).

In winter it was taken in the Organ Mountains, January 30, 1903 (Gaut), at Albuquerque, January 17, 1900 (Birtwell), and at Silver City, January 26, 1884 (Marsh).

On the return in spring it was noted at Fort Union, 6,700 feet, March 22, 1892 (Coale), and remained at Fort Thorn until late in April (Henry).—W. W. COOKE.

NEST.—On the ground in open places; made largely of dried grasses, lined generally with hair and feathers. *Eggs*: Usually 4, green or white, spotted with blackish or shades of brown; or white, unmarked.

FOOD.—Largely weed seeds, and insects, including weevils and grasshoppers.

GENERAL HABITS.—On the plains of Montana, Mr. Cameron wrote, the McCown Longspur “arrives in immense flocks towards the end of April, and is seemingly a most punctual migrant, as my notes give April 26, 27, and 29, for 1897, ’98, and ’99 as the dates of first appearance. The birds, which scatter over the ground as they alight, hide in the horse and cattle hoof prints, or other holes, and allow themselves to be almost trodden upon before rising. A large flock was driven into the shelter of my ranch buildings, near Terry, during a terrific thunderstorm . . . the McCown Longspur is in all respects similar in habits to . . . *Calcarius ornatus* [the Chestnut-collared] excepting that in my experience the female *R. mccowni* lays four eggs instead of three. On June 22, 1894, I had ample opportunity for observing this species, as, my horse having run away, I was compelled to walk home, ten miles across the prairie. My way was enlivened by the handsome males, which hung above me, before sinking into the grass with a burst of song, in strong contrast to the dowdy brown females, which I frequently flushed from their nests” (1907, p. 406).

In making a horseback trip across Montana Mr. Saunders found the Longspurs “in full song, a charmingly sweet song, that tinkled across the prairie continually from all sides. . . . The song is nearly always rendered when in flight. The bird leaves the ground and flies upward on a long slant till fifteen or twenty feet high, then it spreads both wings outward and upward, lifts and spreads its white tail feathers, erects the upper tail coverts and feathers of the lower back, and, bursting into song, floats downward into the grass like an animated parachute, singing all the way” (1912, p. 217). In some places on the flat-topped prairie benches, Mr. Saunders says, “this is the only bird to be found” (1914, p. 137).

In the late fall, Ernest Thompson Seton found the Longspurs in northeastern New Mexico. From Clayton, on October 22, 1893, he wrote—“Fifty yards back of the palatial hotel is a muddy pond on the tin-bedecked prairie. Around this all day the bird life is swarming. There are dozens of Killdeers, scores of Brewer Blackbirds, hundreds of Shorelarks, and thousands of white-tailed Longspurs. No doubt they are somewhat concentrated here on account of the water—a scarce opportunity in this land—but on the prairie they are almost as abundant.”

The next day he added—“Collected some Longspurs, by the help of a wild cowboy who, thanks to his prairie pony, was able to retrieve my specimens that fell on the gumbo flat. All were McCowni.” A week later he wrote from Clapham—“As I take my daily ride, I see countless multitudes of these Longspurs. They are by far the most abundant bird of the region. At each hundred yards, on the prairie, a flock of fifty or a hundred rises and flies over, usually going southward, display-

ing their white tails as they go overhead, and announcing their identity by a little *chirrup chirrup*" (MS).

CHESTNUT-COLLARED LONGSPUR: *Calcarius ornatus* (J. K. Townsend)

DESCRIPTION.—*Male*: Length (skins) 4.6–5.9 inches, wing 3.2–3.5, tail 2–2.4, bill .4. *Female*: Length (skins) 4.7–5.6 inches, wing 3–3.3, tail 1.9–2.2, bill .4. Bill small, wings long and pointed, tail more than half hidden by pointed upper coverts, hind toe very long, and nearly straight. *Adult male in summer*: Broad superciliary stripe, chin, and throat white, in striking contrast to black of crown and underparts (black of underparts sometimes mixed with rufous or chestnut); hind neck chestnut-rufous; rest of upperparts streaked; tail feathers, except middle pair, white at base, two or three lateral feathers entirely white; in full plumage lesser coverts black, tipped with white. *Adult male in winter*: Similar, but black and chestnut of head and underparts obscured or concealed by brownish or buffy tips to feathers. *Adult female*: Grayish buffy brown, streaked above and sometimes below. In winter, plumage softer and colors more blended. *Young*: Upperparts dusky, feathers bordered with brownish buff and whitish, giving ringed appearance; wing coverts tipped with whitish; line over eye indistinct, ear coverts and throat marked with dusky; rest of underparts grayish buff, streaked, especially on breast.



FIG. 136.
Foot of Longspur

REMARKS.—The female is an obscure bird but may be recognized by its long hind toe and tail pattern. In flight the "white tail" is very conspicuous (Coues).

RANGE.—Breeds in Transition and Upper Sonoran Zones from Montana, southeastern Alberta, southern Saskatchewan, and Manitoba south to Minnesota, central Kansas, and northern Wyoming; winters from Colorado, Nebraska, and Iowa to Arizona, Sonora, and southern end of Mexican tableland. Recorded from British Columbia.

STATE RECORDS.—The Chestnut-collared Longspur reaches New Mexico from its northern breeding ground about the middle of the general fall migration; Willis, September 12, 1883 (Henshaw); near Koehler Junction, abundant after September 12, 1913 (Kalmbach); near Corona, October 19, 1902 (Gaut); Gila River, October 17, 1873 (Sennett); Apache, October 1, 1889 (Anthony); Tularosa, November 10, 1873 (Henshaw).

In winter, at the south end of the San Mateo Mountains, it was abundant in the rank grass on open mesas and ridges, December 7–10, 1915 (Ligon), and since it occurs all winter in Colorado, it undoubtedly does the same in New Mexico. When Anthony arrived at Apache in February, 1886, he found it present and it had presumably been there all winter. It was an abundant species and remained until April 10. It had been noted at Silver City from February 23 to March 13, 1884 (Marsh), and was taken there March 9, 1914 (Kellogg), at Fort Union, March 22, 1892 (Coale), and at Gage, April 17, 1885 (Mearns). The species therefore occurs in winter at 4,000–6,000 feet, while in migration it rarely ascends to 7,800 feet.

The specimen taken at Fort Thorn and made the type of Baird's *melanotus* proved to represent the winter plumage of *ornatus*.—W. W. COOKE.

NEST.—On the ground, under a clump of tall weeds; made largely of dried grasses, lined with cow hair or feathers. *Eggs*: Usually 3, white, tinged with pink, buff, or green; distinctly spotted with blackish or shades of brown.

FOOD.—Largely weed seed and insects, including crickets and grasshoppers, leaf beetles, and weevils.

LITERATURE CITED

- ABBOT, GERARD ALAN.
1906. Up the Yellowstone on a pinto: The Condor, vol. 8, pp. 151-152.
- AIKEN, CHARLES EDWARD HOWARD, and EDWARD ROYAL WARREN.
1914. The birds of El Paso County, Colorado: Colo. College Publ., science series, vol. 12, no. 13, pp. 455-496.
- ALLEN, ARTHUR AUGUSTUS.
1914. At home with a Hell-Diver: Some observations on the nesting of the Pied-billed Grebe: Bird-Lore, vol. 16, pp. 243-253; 7 photos.
1915. The behavior of the Least Bittern: Bird-Lore, vol. 17, pp. 425-430; 5 photos.
1924. A contribution to the life history and economic status of the Screech Owl (*Otus asio*): The Auk, vol. 41, pp. 1-16; 5 pls.
- ALLEN, CHARLES SLOVER.
1892. Breeding habits of the Fish Hawk on Plum Island, New York: The Auk, vol. 9, pp. 313-321; 2 pls.
- ALLEN, FRANCIS HENRY.
1919. The aesthetic sense in birds as illustrated by the Crow: The Auk, vol. 36, pp. 112-113.
- ALLEN, GLOVER MORRILL.
1925. Birds and their attributes (Boston, Marshall Jones Co.), xiii+338 pp.; illus.
- ALLEN, JOEL ASAPH.
1879. The Evening Grosbeak in New Mexico: Bull. Nuttall Ornith. Club, vol. 4, p. 237.
1892. The North American species of the genus *Colaptes*, considered with special reference to the relationships of *C. auratus* and *C. cafer*: Bull. Amer. Mus. Nat. Hist., vol. 4, pp. 21-24.
- ANTHONY, ALFRED WEBSTER.
1891. Notes on the Cactus Wren: Zoe, vol. 2, pp. 133-134.
1892. Birds of southwestern New Mexico: The Auk, vol. 9, pp. 357-369.
1896. The Road-runner as a rat-killer: The Auk, vol. 13, pp. 257-258.
1897. The Road-runner as a destroyer of caterpillars: The Auk, vol. 14, p. 217.
1903. Nesting of the Townsend Solitaire: The Condor, vol. 5, pp. 10-12; 2 photos.
- ATKINS, EMERSON.
1894. The great Northern Diver in New Mexico: The Nidiologist, vol. 1, p. 77.
- AVERILL, CHARLES KETCHUM.
1922. A law governing the elevation of the nesting site: The Condor, vol. 24, pp. 57-60.
1927. Emargination of the long primaries in relation to power of flight and migration: The Condor, vol. 29, pp. 17-18; diagram.
- BADE, E.
1919. How birds can take their own pictures: Bird-Lore, vol. 21, pp. 342-346; 6 photos.
- BAERG, WILLIAM J.
1926. Trying to tame a Great Horned Owl: The Auk, vol. 43, pp. 214-217; 1 photo.
- BAILEY, ALFRED MARSHALL.
1926. A report of the birds of northwestern Alaska and regions adjacent to Bering Strait: The Condor, vol. 28, pp. 121-126; 2 photos.
1927. Notes on the birds of southeastern Alaska: The Auk, vol. 44, pp. 1-23, 3 pls.; 184-205, 2 pls.; 351-367.
- BAILEY, FLORENCE [AUGUSTA] MERRIAM.
1902a. Handbook of birds of the Western United States (Boston, Houghton Mifflin and Company), xc+511 pp.; 36 pls., 601 figs.
1902b. The Scissor-tailed Flycatcher in Texas: The Condor, vol. 4, pp. 30-31.

BAILEY, FLORENCE [AUGUSTA] MERRIAM—Continued.

- 1904a. Twelve Rock Wrens' nests in New Mexico: *The Condor*, vol. 6, pp. 68-70; 2 photos.
- 1904b. A Dusky Grouse and her brood in New Mexico: *The Condor*, vol. 6, pp. 87-89; 1 photo.
- 1904c. Scott Oriole, Gray Vireo, and Phoebe in northeastern New Mexico: *The Auk*, vol. 21, pp. 392-393.
- 1905a. Breeding notes from New Mexico: *The Condor*, vol. 7, pp. 39-40.
- 1905b. Notes from northern New Mexico: *The Auk*, vol. 22, pp. 316-318.
- 1906a. A nest of *Empidonax difficilis* in New Mexico: *The Condor*, vol. 8, p. 108; 1 photo.
- 1906b. Nesting sites of the Desert Sparrow: *The Condor*, vol. 8, pp. 111-112; 1 photo.
1907. White-throated Swifts at Capistrano: *The Condor*, vol. 9, pp. 169-172; 2 photos.
- 1910a. An irrigated ranch in the fall migration: *The Condor*, vol. 12, pp. 161-163.
- 1910b. The Palm-leaf Oriole: *The Auk*, vol. 27, pp. 33-35; 2 pls.
- 1910c. Wild life of an alkaline lake: *The Auk*, vol. 27, pp. 418-427.
1913. With Asio in the greenwood: *Bird-Lore*, vol. 15, pp. 285-290; 1 photo.
1915. A family of North Dakota Marsh Hawks: *Bird-Lore*, vol. 17, pp. 431-438; 5 photos.
- 1915-1916. Characteristic birds of the Dakota prairies: *The Condor*, vol. 17, 1915, pp. 173-179, 222-226; vol. 18, 1916, pp. 14-21, 54-58.
- 1916a. A home in the forest: *Bird-Lore*, vol. 18, pp. 229-233 (Brown Creeper).
- 1916b. A populous shore: *The Condor*, vol. 18, pp. 100-110.
- 1917a. Birds of the humid coast: *The Condor*, vol. 19, pp. 8-13, 46-54, 95-101; 1 illus.
- 1917b. Red letter days in southern California: *The Condor*, vol. 19, pp. 155-159.
- 1918-1920. A return to the Dakota lake region: *The Condor*, vol. 20, 1918, pp. 24-37, 64-70, 110-114, 132-137, 170-178; vol. 21, 1919, pp. 3-11, 108-114, 157-162, 189-193, 225-230; vol. 22, 1920, pp. 21-26, 66-72, 103-108.
- 1922a. Koo: *Bird-Lore*, vol. 24, pp. 260-265; 2 photos.
- 1922b. Cactus Wrens' nests in southern Arizona: *The Condor*, vol. 24, pp. 163-168.
- 1923a. Notable migrants not seen at our Arizona bird table: *The Auk*, vol. 40, pp. 393-409.
- 1923b. Birds recorded from the Santa Rita Mountains in southern Arizona: *Cooper Ornith. Club, Pacific Coast Avifauna* No. 15, 60 pp.; 4 figs.
- 1923c. Fifteen Arizona Verdins' nests: *The Condor*, vol. 25, pp. 20-21.
1924. An Arizona valley bottom: *The Auk*, vol. 41, pp. 423-432.
- BAILEY, GUY ANDREW.
1921. Three weeks in the boat-blind: *Bird-Lore*, vol. 23, pp. 233-237; 5 photos.
1922. The trailer blind de luxe: *Bird-Lore*, vol. 24, pp. 323-327; 6 photos.
- BAILEY, SAMUEL WALDO.
1915. The Plum Island Night Herons: *The Auk*, vol. 32, pp. 424-441.
- BAILEY, VERNON [ORLANDO].
1902. Contributions to Handbook of birds of the Western United States (see Bailey, Florence Merriam, 1902a).
1903. The White-necked Raven: *The Condor*, vol. 5, pp. 87-89; 2 photos.
1913. Life zones and crop zones of New Mexico: *Biol. Surv., U. S. Dept. Agr., N. Amer. Fauna* No. 35, 100 pp.; 16 pls., 6 figs., 1 map.
- 1928a. Animal life of the Carlsbad Cavern (Baltimore, Williams and Wilkins Co.), xiii + 195 pp.; 67 figs., including colored life-zone map.
- 1928b. A Hybrid Scaled $\times$ Gambel's Quail from New Mexico: *The Auk*, vol. 45, p. 210.

- BAILEY, VERNON, and FLORENCE MERRIAM BAILEY.
1918. Wild animals of Glacier National Park: Nat. Park Service, U. S. Dept. Int., 210 pp.; 37 pls., 94 figs., map.
- BAILY, WILLIAM LLOYD.
1900. The Kingfishers' home life: Bird-Lore, pp. 76-80; 4 photos.
- BALDWIN, SAMUEL PRENTISS, and WILFRID WEDGWOOD BOWEN.
1928. Nesting and local distribution of the House Wren: The Auk, vol. 45, pp. 186-199; 5 figs.
- BARROWS, WALTER BRADFORD.
1913. Concealing action of the Bittern: The Auk, vol. 30, pp. 187-190.
- BASSETT, FRANK NEWTON.
1926. The pool an attraction for birds: The Condor, vol. 28, pp. 61-67; 1 photo.
- BATCHELDER, CHARLES FOSTER.
1885. Winter notes from New Mexico: The Auk, vol. 2, pp. 121-128, 233-239.
- BEAL, FOSTER ELLENBOROUGH LASCELLES.
1907. Birds of California in relation to the fruit industry, Part I: Biol. Surv., U. S. Dept. Agr., Bull. 30, 100 pp.; 5 pls. (1 colored).
1910. Birds of California in relation to the fruit industry, Part II: Biol. Surv., U. S. Dept. Agr., Bull. 34, 96 pp.; 6 colored pls.
1911. Food of the Woodpeckers of the United States: Biol. Surv., U. S. Dept. Agr., Bull. 37, 64 pp.; 6 pls. (5 colored), 3 figs.
1912. Food of our more important Flycatchers: Biol. Surv., U. S. Dept. Agr., Bull. 44, 67 pp.; 5 pls. (4 colored).
1918. Food habits of the Swallows: A family of valuable native birds: U. S. Dept. Agr. Bull. 619, 28 pp.; 2 pls.
- BEAL, F. E. L., WALDO LEE MCATEE, and EDWIN RICHARD KALMBACH.
1918. Common birds of the Southeastern United States in their relation to agriculture: U. S. Dept. Agr. Farmers' Bull. 755, 40 pp.; 20 figs. (Revised, 1927.)
- BEAM, MARY HESTER.
1925. A record-breaking Mourning Dove: Bird-Lore, vol. 27, pp. 158-161; 1 photo.
- BEEBE, CHARLES WILLIAM.
1907. Notes on the early life of Loon chicks: The Auk, vol. 24, pp. 34-41; 1 pl.
1918-1922. A monograph of the pheasants (London, H. F. and G. Witherby, under auspices New York Zool. Soc.), 4 quarto vols., colored fronts., plates (part colored), maps.
1926. Pheasants, their lives and homes (Garden City, N. Y., Doubleday, Page & Co.), revised and condensed edition, 2 vols., colored fronts., plates (part colored), map.
- BENDIRE, CHARLES EMIL.
1889. *Picicorvus columbianus* (Wils.) its nest and eggs: The Auk, vol. 6, pp. 226-236.
1892. Life histories of North American birds, with especial reference to their breeding habits and eggs: Smithsonian Contributions to Knowledge, vol. 28; also published as U. S. Nat. Mus. Special Bull. No. 1. Gallinaceous Birds, Hawks and Owls, viii+446 pp.; 12 pls. of eggs (colored).
1895. Idem. Parrots to Grackles: Smithsonian Contributions to Knowledge, vol. 32; also published as U. S. Nat. Mus. Special Bull. No. 3, ix+518 pp.; 7 pls. of eggs (colored).
- BENNETT, WALTER WALDO.
1925. Two days with the American Avocet: Bird-Lore, vol. 27, pp. 86-91; 6 photos.

BENT, ARTHUR CLEVELAND.

- 1901-1902. Nesting habits of the Anatidae in North Dakota: *The Auk*, vol. 18, pp. 328-336, 3 pls; vol. 19, pp. 1-12, 3 pls.; 165-174, 2 pls.
 1907-1908. Summer birds of Saskatchewan: *The Auk*, vol. 24, pp. 407-430, 4 pls.; vol. 25, pp. 25-35.
 1919. Life histories of North American Diving Birds, order Pygopodes: *U. S. Nat. Mus. Bull.* 107, xiii+245 pp.; 55 pls.
 1921. Life histories of North American Gulls and Terns, order Longipennes: *U. S. Nat. Mus. Bull.* 113, x+345 pp.; 93 pls.
 1922. Life histories of North American Petrels, Pelicans, and their allies: *U. S. Nat. Mus. Bull.* 121, xii+343 pp.; 69 pls.
 1923. Life histories of North American Wild Fowl (part): *U. S. Nat. Mus. Bull.* 126, ix+250 pp.; 46 pls.
 1925. Life histories of North American Wild Fowl (part): *U. S. Nat. Mus. Bull.* 130, x+376 pp.; 60 pls.
 1926. Life histories of North American Marsh Birds: *U. S. Nat. Mus. Bull.* 135, xii+490 pp.; 98 pls.
 1927. Life histories of North American Shore Birds, order Limicolae (Part 1): *U. S. Nat. Mus. Bull.* 142, ix+420 pp.; 55 pls.

BERGTOLD, WILLIAM HARRY.

1909. The little White Egret in New Mexico: *The Auk*, vol. 26, p. 76.
 1913. A study of the House Finch: *The Auk*, vol. 30, pp. 40-73.
 1916. Eye shine in birds: *The Auk*, vol. 33, p. 81.
 1928a. More Colorado Ducks: *The Auk*, vol. 45, pp. 170-176.
 1928b. A guide to Colorado birds (Denver, Smith Brooks Printing Co.), 207 pp.

BERRY, SAMUEL STILLMAN.

1922. Magpies versus livestock: An unfortunate new chapter in avian depredations: *The Condor*, vol. 24, pp. 13-17; 2 photos.

BIRTWELL, FRANCIS JOSEPH.

- 1901a. Nesting habits of the Evening Grosbeak (*Coccothraustes vespertinus*): *The Auk*, vol. 18, pp. 388-391, 1 pl. [copied and completed by his wife, Olivia M. Birtwell].
 1901b. Two interesting records from New Mexico: *The Auk*, vol. 28, pp. 112-113.

BOND, FRANK.

1900. A nuptial performance of the Sage Cock: *The Auk*, vol. 17, pp. 325-327; 1 pl., 1 fig.

BOWLES, CHARLES WARREN.

1902. Notes on the Black-throated Gray Warbler: *The Condor*, vol. 4, pp. 82-85; 1 photo.

BOWLES, JOHN HOOPER.

1899. Decoy nests of the Western Winter Wren: *Bull. Cooper Orn. Club* (= *Condor*, vol. 1), p. 72.
 1904. Nesting of the Western Golden-crowned Kinglet in western Washington: *The Condor*, vol. 6, pp. 163-165; 1 photo.
 1908. A few summer birds of Lake Chelan, Washington: *The Condor*, vol. 10, pp. 191-193.
 1921. Nesting habits of Nighthawk at Tacoma, Wash.: *The Auk*, vol. 38, pp. 203-217.

BOWLES, JOHN HOOPER, and ALFRED BRAZIER HOWELL.

1912. The Shore Birds of Santa Barbara: *The Condor*, vol. 14, pp. 5-11; 3 photos.

BRADBURY, WILLIAM CHASE.

1915. Notes on the nesting of the White-tailed Ptarmigan in Colorado: *The Condor*, vol. 17, pp. 214-222; 5 photos.
 1917. Notes on the nesting habits of the Clarke Nutcracker in Colorado: *The Condor*, vol. 19, pp. 149-155; 4 photos.

BRADBURY, WILLIAM CHASE—Continued.

- 1918a. Notes on the nesting of the Mountain Plover: *The Condor*, vol. 20, pp. 157-163; 8 photos.
- 1918b. Notes on the nesting habits of the White-throated Swift in Colorado: *The Condor*, vol. 20, pp. 103-110; 6 photos.
- 1919. Nesting notes on the Rocky Mountain Creeper: *The Condor*, vol. 21, pp. 49-52; 4 photos.
- 1920. Nesting of the Rocky Mountain Jay: *The Condor*, vol. 20, pp. 197-208; 11 photos.

BRADSHAW, FREDERICK.

- 1919. A check-list of the birds of Saskatchewan: Rept. of chief game warden for Province of Saskatchewan for year ending April 30, 1919, pp. 21-25.

BREWSTER, WILLIAM.

- 1880. Notes on some birds from Arizona and New Mexico, with a description of a supposed new Whippoorwill: *Bull. Nuttall Ornith. Club*, vol. 6, pp. 65-73.
- 1882a. Notes on the habits and changes of plumage of the Acadian Owl (*Nyctala acadica*): *Bull. Nuttall Ornith. Club*, vol. 7, pp. 23-25.
- 1882b. On a collection of birds lately made by Mr. F. Stephens in Arizona: *Bull. Nuttall Ornith. Club*, vol. 7, pp. 65-86, 135-147, 193-212; vol. 8, pp. 21-36.
- 1886. Bird migration: *Memoirs of the Nuttall Ornith. Club*, no. 1, pp. 5-22.
- 1890. Summer Robin roosts: *The Auk*, vol. 7, pp. 360-373.
- 1898. Lewis Woodpecker storing acorns: *The Auk*, vol. 15, p. 188.
- 1902a. Voices of a New England marsh: *Bird-Lore*, vol. 4, pp. 43-56; illus.
- 1902b. Birds of the cape region of Lower California: *Bull. Mus. Comp. Zool.*, Harvard College, vol. 41, no. 1, 241 pp.; 1 map.
- 1906. The birds of the Cambridge region of Massachusetts: *Memoir 4 of the Nuttall Ornith. Club*, 426 pp.; 4 pls., 3 maps.
- 1911a. Courtship of the American Golden-eye or Whistler (*Clangula clangula americana*): *The Condor*, vol. 13, pp. 22-30; illus.
- 1911b. Concerning the nuptial plumes worn by certain Bitterns and the manner in which they are displayed: *The Auk*, vol. 28, pp. 90-100.
- 1924-1925. The birds of the Lake Umbagog region of Maine: *Bull. Mus. Comp. Zoology*, Harvard College, vol. 66, part I, Grebes to Coots, 1924, 209 pp., part II, Phalaropes to Owls, 1925, 402 pp.

BROOKS, ALLAN [CYRIL],

- 1920. Notes on some American Ducks: *The Auk*, vol. 37, pp. 353-367; 2 pls., diagrams.
- 1926. The display of Richardson's Grouse with some notes on the species and subspecies of the genus *Dendragapus*: *The Auk*, vol. 43, pp. 281-287; 2 pls.

BROOKS, ALLAN [CYRIL], and HARRY SCHELWALDT SWARTH.

- 1925. A distributional list of the birds of British Columbia: *Cooper Ornith. Club, California, Pacific Coast Avifauna No. 17*, 158 pp.; 1 pl. (colored), 38 figs., including maps.

BROWN, HERBERT.

- 1902. Unusual abundance of Lewis's Woodpecker near Tucson, Arizona, in 1884: *The Auk*, vol. 19, pp. 80-83.

BRYANT, HAROLD CHILD.

- 1914. A survey of the breeding grounds of Ducks in California in 1914: *The Condor*, vol. 16, pp. 217-239; 9 photos.
- 1916. Habits and food of the Road-runner in California: *Univ. Calif. Publ. Zool.*, vol. 17, no. 5, pp. 21-58; 4 pls., 2 figs.
- 1921. California Hawks: How to identify them: *Calif. Fish and Game*, vol. 7, pp. 133-147; 2 pls. (colored), 8 figs.

BRYANT, HAROLD CHILD, and AMY MORRISH BRYANT.

- 1915. A two hours acquaintance with a family of Water Ouzels: *The Condor*, vol. 17, pp. 98-99.

BURCHAM, JOHN SAMUEL.

1904. Notes on the habits of the Water Ouzel (*Cinclus mexicanus*): The Condor, vol. 6, p. 50.

BUTLER, AMOS WILLIAMS.

1926. Land birds at sea: The Auk, vol. 43, p. 103.

CAMERON, EWEN SOMERLED.

1905. Nesting of the Golden Eagle in Montana: The Auk, vol. 22, pp. 158-167; 5 pls.
1907-1908. Birds of Custer and Dawson Counties, Montana: The Auk, 1907, vol. 24, pp. 241-270, 389-406, 10 pls., 2 maps; 1908, vol. 25, pp. 39-56.
1908. Observations on the Golden Eagle in Montana: The Auk, vol. 25, pp. 251-268; 4 pls.
1914. The Ferruginous Rough-leg in Montana: The Auk, vol. 31, pp. 159-167; 5 pls.

CAREY, HENRY REGINALD.

1925. With camera and 'jack-light' on the seashore: Bird-Lore, vol. 27, pp. 1-7; 4 photos.

CARPENTER, NELSON KITWOOD.

1903. The Hummingbirds of Escondido and vicinity: The Condor, vol. 5, p. 20.

CARRIGER, HENRY WARD, and JOHN ROY PEMBERTON.

1907. Nesting of the Pine Siskin in California: The Condor, vol. 9, pp. 18-19; 2 photos.
1908. Some notes on the Great Blue Heron: The Condor, vol. 10, pp. 78-81; 3 photos.

CARRIGER, HENRY WARD, and GURNIE WELLS.

1919. Nesting of the Northern Pileated Woodpecker: The Condor, vol. 21, pp. 153-156; 1 photo.

CHADBOURNE, ARTHUR PATTERSON.

1889. An unusual flight of Killdeer Plover (*Aegialitis vocifera*) along the New England coast: The Auk, vol. 6, pp. 255-263.

CHAMBERS, WILLIE LEE.

1921. A flight of Harris Hawks: The Condor, vol. 23, p. 65.
1924. Another flight of Harris Hawks: The Condor, vol. 26, p. 75.

CHAPIN, JAMES PAUL.

1922. The function of the oesophagus in the Bittern's booming: The Auk, vol. 39, pp. 196-202; illus.

CHAPMAN, FRANK MICHLER.

- 1905-1928. Notes on the plumage of North American birds: Bird-Lore, vols. 5-30; illus. (colored). (Still continuing.)
1907. The Warblers of North America (New York, D. Appleton and Co.), ix+306 pp.; 24 pls. (colored), photos.
1908a. Camps and cruises of an ornithologist (New York, D. Appleton and Co.), xvi+432 pp.; 250 photos.
1908b. The Fish Hawks of Gardiner Island: Bird-Lore, vol. 10, pp. 153-159; 9 photos.
1912. Handbook of birds of Eastern North America (New York, D. Appleton and Co.), second edition, xxix+530 pp.; 24 pls., 136 figs.

CLABAUGH, ERNEST DWIGHT.

1928. Winter roosts of Western Robins: The Condor, vol. 30, p. 126.

CLARK, AUSTIN HOBART.

1926. Animal voices: Scientific Monthly, January, pp. 40-48.

COALE, HENRY KELSO.

1915. The present status of the Trumpeter Swan (*Olor buccinator*): The Auk, vol. 32, pp. 82-90; 4 pls.

CONOVER, HENRY BOARDMAN.

1926. Game birds of the Hooper Bay region, Alaska: The Auk, vol. 43, pp. 162-180; 303-318; 2 pls.

COOKE, WELLS WOODBRIDGE.

1884. The distribution and migration of *Zonotrichia querula*: The Auk, vol. 1, pp. 332-337.
1903-1916. The migration of North American birds: Bird-Lore, vols. 3-18.
1904a. Distribution and migration of North American Warblers: Biol. Surv., U. S. Dept. Agr., Bull. 18, 142 pp.
1904b. Some new facts about the migration of birds: The Condor, vol. 6, pp. 115-126.
1906. Distribution and migration of North American Ducks, Geese, and Swans: Biol. Surv., U. S. Dept. Agr., Bull. 26, 90 pp.
1910. Distribution and migration of North American Shorebirds: Biol. Surv., U. S. Dept. Agr., Bull. 35, 100 pp.; 4 pls.
1913. Distribution and migration of North American Herons and their allies: Biol. Surv., U. S. Dept. Agr., Bull. 45, 70 pp.; 21 maps.
1914. Distribution and migration of North American Rails and their allies: U. S. Dept. Agr. Bull. 128, 50 pp.; 19 maps.
1915a. Our Shorebirds and their future: U. S. Dept. Agr. Yearbook, Separate 642, pp. 275-294; 3 pls., 3 figs.
1915b. Distribution and migration of North American Gulls and their allies: U. S. Dept. Agr. Bull. 292, 70 pp.; 28 distribution maps.
1915c. Bird migration: U. S. Dept. Agr. Bull. 185, 48 pp.; 2 pls., 20 maps.

COOPER, JAMES GRAHAM.

1860. Report upon birds collected: Rept. Expl. and Surv. for railroad from Mississippi River to Pacific Ocean ("Pacific Railroad Report"), 1853-1855, vol. 12, book 2, no. 3, chap. 1. Land birds, pp. 140-291; 7 pls. (colored).

CORDIER, ALBERT HAWES.

1927. Some observations on the Water Ouzel: The Auk, vol. 44, pp. 169-178; 2 pls.

CORY, CHARLES BARNEY.

1897. How to know the Ducks, Geese, and Swans (Boston, Little, Brown and Co.), 95 pp.; illus.

COTTAM, CLARENCE.

1928. Killdeer swimming on Green River, Utah: The Auk, vol. 45, pp. 207-208.

COUES, ELLIOTT.

1874. Birds of the Northwest: U. S. Geol. Surv. of the Territories, Misc. Publ. No. 3, xi+791 pp.
1878. Birds of the Colorado Valley: Dept. Interior, Misc. Publ. No. 11, xvi+806 pp.; 66 figs.
1903. Key to North American birds (Boston, Dana Estes and Co.), fifth edition, revised, 2 vols., xli+1152 pp.; 747 figs.

CRABBE, EDWARD D.

1923. Notes on the nesting of a pair of Dickcissels (*Spiza americana*): The Auk, vol. 40, pp. 605-609.

CRAIG, WALLACE.

1911. The expression of emotion in the Pigeons: II, The Mourning Dove (*Zenaidura macroura* Linn.): The Auk, vol. 28, pp. 398-407.

CULVER, DELOS EVERETT.

1914. Concealing postures of Grebes: The Auk, vol. 31, pp. 395-396.
1919. Duck Hawk wintering in the center of Philadelphia: The Auk, vol. 36, pp. 108-109.

DAVIS, EDWIN RUSSELL.

1926. Friendly Siskins: Bird-Lore, vol. 28, pp. 381-388; 4 photos.

DAWSON, WILLIAM LEON.

1913. The nesting of the Prairie Falcon in San Luis Obispo County: The Condor, vol. 15, pp. 55-62; illus.
1915. The nesting of the Black Swift: The Condor, vol. 17, pp. 8-12; 4 photos.
1919. The Solitaires of Shasta: The Condor, vol. 21, pp. 12-21; 5 figs.

DEARBORN, NED.

1912. The English Sparrow as a pest: U. S. Dept. Agr. Farmers' Bull. 493, 24 pp.; 17 figs.
 1914. Bird houses and how to build them: U. S. Dept. Agr. Farmers' Bull. 609, 19 pp.; 48 figs.

DEMILLE, JOHN BLAKENEY.

1925. A year's friendship with the Canada Jay: Bird-Lore, vol. 27, pp. 377-381; 3 photos.

DICE, LEE RAYMOND.

1917. Habits of the Magpie in southeastern Washington: The Condor, vol. 19, pp. 121-124; 2 photos.

DICKEY, DONALD RYDER.

1914. The nesting of the Spotted Owl: The Condor, vol. 16, pp. 193-202; 7 photos.
 1922. The mimetic aspect of the Mockers' song: The Condor, vol. 24, pp. 153-157; 4 photos.

DIXON, JAMES BENJAMIN.

1912. The Costa Hummingbird: The Condor, vol. 14, pp. 75-77.
 1914. History of a pair of Pacific Horned Owls: The Condor, vol. 16, pp. 47-54; 8 photos.

DIXON, JOSEPH SCATTERGOOD.

1908. A family of young Duck Hawks: The Condor, vol. 10, pp. 198-200; 2 photos.
 1917. The home life of the Baird Sandpiper: The Condor, vol. 19, pp. 77-84; 5 photos, maps.
 1919. Wild Ducks as guests in a city park: National Geographic Magazine, vol. 36, pp. 331-342; 11 photos.
 1920. Nesting of the Olive-sided Flycatcher in Berkeley, California: The Condor, vol. 22, pp. 200-202; 3 photos.
 1922. The common Hawks and Owls of California from the standpoint of the rancher: Univ. Calif. College of Agr., Agr. Exp. Sta. Circ. 236, 17 pp.; 12 figs.
 1924. Nesting of the Wood Duck in California: The Condor, vol. 26, pp. 41-66; 26 photos.
 1927a. Contribution to the life history of the Alaska Willow Ptarmigan: The Condor, vol. 29, pp. 213-223; 13 photos.
 1927b. A lesson in civic ornithology: Bird-Lore, vol. 29, pp. 329-334; 8 photos.

DRIVER, EDWARD RAYMOND.

1922. Birds bathing: Bird-Lore, vol. 24, pp. 140-142; 1 photo.

DUBOIS, ALEXANDER DAWES.

- 1923a. An experiment with a Rufous Hummingbird: The Condor, vol. 25, pp. 157-159; 2 photos.
 1923b. The Short-eared Owl as a foster-mother: The Auk, vol. 40, pp. 383-393; 4 pls.
 1924. A nuptial song-flight of the Short-eared Owl: The Auk, vol. 41, pp. 260-263.

DUNTON, EDITH KELLOGG.

1917. Taming Evening Grosbeaks: Bird-Lore, vol. 19, pp. 310-314; 3 photos.

DWIGHT, JONATHAN.

1900. The moult of the North American Tetraonidae (Quails, Partridges, and Grouse): The Auk, vol. 17, pp. 34-51; 143-166; 2 pls.
 1925. The Gulls of the World (Laridae): Their plumages, moults, variations, relationships, and distribution: Bull. Amer. Mus. Nat. Hist., vol. 52, art. 3, pp. 63-408; 5 pls., 384 figs.

EATON, ELON HOWARD.

1909. Birds of New York (Albany, N. Y., University of the State of New York): New York State Museum, Memoir 12, Part I, Water Birds and Game Birds, 501 pp.; 42 pls.
 1914. Idem. Part II, Hawks to Thrushes, 719 pp.; 64 pls.

- ECKSTORM, FANNIE HARDY.
1901. The Woodpeckers (Boston, Houghton, Mifflin and Co.), 131 pp.; 5 pls. (colored) and figs.
- EDSON, JOHN MILTON.
1925. The hooters of skyline ridge: The Condor, vol. 27, pp. 226-229.
- EDWARDS, HARLAN ARDEN.
1919. Losses suffered by breeding birds in southern California: The Condor, vol. 21, pp. 65-68.
- EMERSON, WILLIAM OTTO.
1899. Coming of the Mockingbird: Bull. Cooper Orn. Club (= Condor, vol. 1), p. 27.
- FARGO, WILLIAM GILBERT.
1928. The courtship display of the American Bittern: The Auk, vol. 45, pp. 203-204.
- FERGUSON, ALFRED LUDLOW, and HENRY LEE FERGUSON.
1922. The fall migration of birds as observed at Fisher Island, N. Y.: The Auk, vol. 39, pp. 488-496.
- FINLEY, WILLIAM LOVELL.
1903. Two Vireos caught with a camera: The Condor, vol. 5, pp. 61-65; 5 photos.
1904. The Black-headed Grosbeak (*Zamelodia melanocephala*): The Condor, vol. 6, pp. 145-148; 4 photos.
1905. A study in bird confidence: The Condor, vol. 7, pp. 91-95; 5 photos.
1907a. American birds studied and photographed from life (New York, Chas. Scribner's Sons), xvi+256 pp.; illustrated by photographs from Bohlman and Finley.
1907b. Among the Pelicans: The Condor, vol. 9, pp. 35-41; 8 photos.
1923. Hunting birds with a camera: National Geographic Magazine, vol. 44, pp. 160-201; photos.
1924. Changing habits of Vaux Swift and Purple Martin: The Condor, vol. 26, pp. 6-9; 4 photos.
- FINLEY, WILLIAM LOVELL, and IRENE FINLEY.
1915. With the Arizona Road-runners: Bird-Lore, vol. 17, pp. 159-165; 7 photos.
- FISHER, ALBERT KENRICK.
1893. The Hawks and Owls of the United States in their relation to agriculture: U. S. Dept. Agr., Division of Ornithology and Mammalogy, Bull. 3, 210 pp.; 26 pls.
1902. Two vanishing Game Birds: Reprint from U. S. Dept. Agr. Yearbook for 1901, pp. 447-458; 2 pls., map.
1907. Hawks and Owls from the standpoint of the farmer: Biol. Surv., U. S. Dept. Agr., Circ. 61, 18 pp.; 6 figs.
- FISHER, GEORGE CLYDE.
1919. Duck Hawks wintering in the center of Philadelphia: The Auk, vol. 36, pp. 108-109.
- FLEMING, JAMES HENRY.
1908. The destruction of Whistling Swans (*Olor columbianus*) at Niagara Falls: The Auk, vol. 25, pp. 306-309.
- FORBES, HENRY STONE, and HILDEGARDE BOUGHTON FORBES.
1927. An autumn Hawk flight: The Auk, vol. 44, pp. 101-102.
- FORBUSH, EDWARD HOWE.
1925. Birds of Massachusetts and other New England States (Boston, Mass. Dept. Agr.), vol. 1, xxxi+481 pp.; 33 pls. (colored).
1927. Idem. Vol. 2, xlix+461 pp.; 27 pls. (colored).
- FOSTER, GOODWIN LE BARON.
1927. A note on the dietary habits of the Barn Owl: The Condor, vol. 29, p. 246.

FOWLER, FREDERICK HALL.

1903. Stray notes from southern Arizona: *The Condor*, vol. 5, pp. 68-71, 106-107.

FRANKLIN, DWIGHT.

1910. Photographing Kingfishers in flight: *Bird-Lore*, vol. 12, pp. 233-236; 5 photos.

FRIEDMANN, HERBERT.

1925. Notes on the birds observed in the Lower Rio Grande Valley of Texas during May, 1924: *The Auk*, vol. 42, pp. 537-554; 5 pls.

FRY, HENRY J.

1916. A study of the seasonal decline of bird song: *The Auk*, vol. 33, pp. 28-40; 1 chart.

FUERTES, LOUIS AGASSIZ.

1903. With the Mearns Quail in southwestern Texas: *The Condor*, vol. 5, pp. 113-116; drawings and photos.
1905. A note on the Prairie Falcon: *The Condor*, vol. 7, pp. 35-36; 1 pl.

GABRIELSON, IRA NOEL.

1913. Nest life of the Catbird: *The Wilson Bulletin*, vol. 25, pp. 166-167.
1914. Pied-billed Grebe notes: *The Wilson Bulletin*, vol. 26, pp. 13-15.
1924. Food habits of some winter bird visitants: *U. S. Dept. Agr. Bull.* 1249, 32 pp.; 5 pls.

GANDER, FRANK FORREST.

1927. Swimming ability of some fledgling birds: *The Auk*, vol. 44, pp. 574-575.

GARDNER, LEON LLOYD.

1925. The adaptive modifications and the taxonomic value of the tongue in birds: *Proc. U. S. Nat. Mus.*, 2591, vol. 67, art. 19, 49 pp.; 16 pls.
1926. Experiments in the economic control of the Western Crow (*Corvus brachyrhynchos hesperis*): *The Auk*, vol. 43, pp. 447-461.
1927. The relation of birds to an outbreak of locusts: *Bird-Lore*, vol. 29, pp. 180-182.

GIGNOUX, CLAUDE.

1921. Speed of flight of the Red-shafted Flicker: *The Condor*, vol. 23, pp. 33-34.
1924. Nesting of Pigmy Nuthatches at Lake Tahoe: *The Condor*, vol. 26, pp. 31-32.

GILLESPIE, JOHN ARTHUR.

1924. The rewards of bird banding: *Bird-Lore*, vol. 26, pp. 236-240; 2 photos.

GILLILAND, MRS. FRANK.

1927. Our pet Hummingbird: *Bird-Lore*, vol. 29, pp. 171-172.

GILMAN, MARSHALL FRENCH.

1902. Notes on the Verdin: *The Condor*, vol. 4, pp. 88-89.
1907a. Magpies on the La Plata: *The Condor*, vol. 9, pp. 9-12.
1907b. Migration and nesting of the Sage Thrasher: *The Condor*, vol. 9, pp. 42-44.
1908. Birds of the Navajo Reservation in New Mexico: *The Condor*, vol. 10, pp. 146-152.
1909a. Among the Thrashers in Arizona: *The Condor*, vol. 11, pp. 49-54.
1909b. Some Owls along the Gila River in Arizona: *The Condor*, vol. 11, pp. 145-150; 5 photos.
1911. Doves on the Pima Reservation: *The Condor*, vol. 13, pp. 51-56.
1915a. A forty acre bird census at Sacaton, Arizona: *The Condor*, vol. 17, pp. 86-90.
1915b. Woodpeckers of the Arizona lowlands: *The Condor*, vol. 17, pp. 151-163; 10 photos.

GLOYD, HOWARD KAY.

1925. Field studies of the diurnal raptures of eastern and central Kansas: *The Wilson Bulletin*, vol. 37, no. 3, pp. 133-149.

- GOSS, BENJAMIN FRANKLIN.
 1883. Notes on the breeding habits of Maximilian's Jay (*Gymnocitta cyanocephala*) and Clarke's Crow (*Picicorvus columbianus*): Bull. Nuttall Ornith. Club, vol. 8, pp. 43-45.
- GOSS, NATHANIEL STICKNEY.
 1881a. Bell's Finch (*Poospiza belli nevadensis*) in New Mexico: Bull. Nuttall Ornith. Club, vol. 6, pp. 116-117.
 1881b. The White-necked Raven in New Mexico: Bull. Nuttall Ornith. Club, vol. 6, pp. 118-119.
 1887. *Merganser americanus* breeding in New Mexico: The Auk, vol. 4, p. 344.
 1891. History of the birds of Kansas (Topeka, Kans., Geo. W. Crane & Co.), 693 pp.; 35 pls.
- GRASETT, FRANK GODWIN.
 1926. Great Blue Heron (*Ardea h. herodias*) alighting in water: The Auk, vol. 43, p. 367.
- GRATWICK, WILLIAM HENRY, JR.
 1926. Feathered Fishermen: Bird-Lore, vol. 28, pp. 95-101; 4 photos.
- GRAVE, BENJAMIN HARRISON, and ERNEST PILLSBURY WALKER.
 1913. The birds of Wyoming, 137 pp.; 1 photo.
- GRINNELL, GEORGE BIRD.
 1910. American Game Bird shooting (New York, Forest and Stream Publishing Co.), xviii+558 pp.; illus.
- GRINNELL, JOSEPH.
 1900. Birds of the Kotzebue Sound Region, Alaska: Cooper Ornith. Club, Pacific Coast Avifauna, no. 1, 80 pp.; 1 map.
 1903. Call notes of the Bush tit: The Condor, vol. 5, pp. 85-87.
 1908. The biota of the San Bernardino Mountains: Univ. Calif. Publ. Zool., vol. 5, no. 1, pp. 1-170; 24 pls.
 1913. The outlook for conserving the Band-tailed Pigeon as a Game Bird in California: The Condor, vol. 15, pp. 25-40; 1 map.
 1914. An account of the mammals and birds of the Lower Colorado Valley, with especial reference to the distributional problems presented: Univ. Calif. Publ. Zool., vol. 12, no. 4, pp. 51-294; pls. 3-13, and 9 text figures.
 1915. A distributional list of the birds of California: Cooper Ornith. Club Pacific Coast Avifauna, no. 11, 217 pp.; 3 pls. (including colored zone map).
 1920. Sequestration notes: The Auk, vol. 37, pp. 84-88.
 1922. The role of the accidental: The Auk, vol. 39, pp. 373-380.
 1925. An early account of the birds of Lake Merritt, Oakland: The Condor, vol. 27, pp. 173-174.
 1927. A critical factor in the existence of southwestern Game Birds: Science, vol. 65, pp. 528-529.
- GRINNELL, JOSEPH, and HARRY SCHELWALDT SWARTH.
 1913. An account of the birds and mammals of the San Jacinto area of southern California, with remarks upon the behavior of geographic races on the margins of their habitats: Univ. Calif. Publ. Zool., vol. 10, no. 10, pp. 197-406; pls. 6-10, 3 figs.
- GRINNELL, JOSEPH, HAROLD CHILD BRYANT, and TRACY IRWIN STORER.
 1918. The Game Birds of California (Berkeley, Univ. Calif. Press), x+642 pp.; 16 colored pls., 94 figs., 19 tables.
- GRINNELL, JOSEPH, and TRACY IRWIN STORER.
 1924. Animal life in the Yosemite: An account of the mammals, birds, reptiles, and amphibians in a cross-section of the Sierra Nevada (Berkeley, Univ. Calif. Press), xviii+752 pp.; 60 pls., 65 figs., 2 colored maps.

- GRISCOM, LUDLOW.
 1922a. Problems of field identification: *The Auk*, vol. 39, pp. 31-41.
 1922b. Field studies of the Anatidae of the Atlantic coast: *The Auk*, vol. 39, pp. 517-530.
- GRISCOM, LUDLOW, and MAUNSEL SCHIEFFELIN CROSBY.
 1925-1926. Birds of the Brownsville region, southern Texas: *The Auk*, vol. 42, pp. 432-440, 519-537; vol. 43, pp. 18-36.
- GROSS, ALFRED OTTO.
 1921. The Dickcissel (*Spiza americana*) of the Illinois prairies: *The Auk*, vol. 38, pp. 1-26; 113-184; 13 pls.
 1923. The Black-crowned Night Heron (*Nycticorax nycticorax naevius*) of Sandy Neck: *The Auk*, vol. 40, pp. 1-30; 191-214; 10 pls.
 1925. Suggested ornithological work for bird banders: *The Auk*, vol. 42, pp. 95-104.
- HALL, E. RAYMOND.
 1925. Pelicans versus fishes in Pyramid Lake: *The Condor*, vol. 27, pp. 147-160.
 1926. Water Birds at Pyramid Lake, Nevada: *The Condor*, vol. 28, pp. 87-91.
- HANFORD, FORREST SHERER.
 1913. Sierra storms and birds: *The Condor*, vol. 15, pp. 137-138.
 1917. The Townsend Solitaire: *The Condor*, vol. 19, pp. 13-15.
- HANNA, WILSON CREAL.
 1909. The White-throated Swift on Slover Mountain: *The Condor*, vol. 11, pp. 77-81; 1 photo.
 1928. Notes on the Dwarf Cowbird in southern California: *The Condor*, vol. 30, pp. 161-162.
- HARRINGTON, ALICE BOWERS.
 1923. Observations on the Mockingbird at Dallas, Texas: *Bird-Lore*, vol. 25, pp. 310-312; 2 photos.
- HARRIS, HARRY [JAMES HENRY].
 1919a. Historical notes on Harris's Sparrow (*Zonotrichia querula*): *The Auk*, vol. 36, pp. 180-190.
 1919b. Birds of the Kansas City region: *Trans. Acad. Sci. St. Louis*, vol. 23, no. 8, pp. 213-371; maps.
- HAUSMAN, LEON AUGUSTUS.
 1925. On the utterances of the Kingbird, *Tyrannus tyrannus* Linn., with especial reference to a recently recorded song: *The Auk*, vol. 42, pp. 320-326.
 1927. The Hawks of New Jersey and their relation to agriculture: *N. J. Agr. Exp. Sta. Bull.* 439, 48 pp.; 36 figs.
- HAWKINS, CHAUNCEY JEDDIE.
 1918. Sexual selection and bird song: *The Auk*, vol. 35, pp. 421-437.
- HAY, OLIVER PERRY.
 1887. The Red-headed Woodpecker a hoarder: *The Auk*, vol. 4, pp. 193-196; 1 photo.
- HEAD, ANNA.
 1902. A study of the Black-headed Grosbeak: *The Condor*, vol. 4, pp. 119-121.
 1906. Observations on the notes and ways of two western Vireos: *The Condor*, vol. 8, pp. 149-150.
- HEERMANN, ADOLPHUS L.
 1859. Report upon birds collected on the Survey. *Rept. Explor. and Surv. for railroad from Mississippi River to Pacific Ocean ("Pacific Railroad Report")*, vol. 10, *Zoology*, 1859, part 3, no. 1, Birds, pp. 9-20, 3 pls.; no. 2, pp. 29-80, 7 pls.

- HENDERSON, JUNIUS.
1908. The American Dipper in Colorado: Bird-Lore, vol. 10, pp. 1-7; 2 photos.
1920. Migrations of the Pinyon Jay in Colorado: The Condor, vol. 22, p. 36.
1927. The practical value of birds (New York, The Macmillan Co.), 342 pp.
- HENDERSON, MARTHA BOOTH.
1924. The Phoebe: Bird-Lore, vol. 26, pp. 89-94; 2 photos.
- HENRY, THOMAS CHARLTON.
1855. Notes derived from observations made on the birds of New Mexico during the years 1853 and 1854: Proc. Acad. Nat. Sci. Philadelphia, vol. 7, pp. 306-317.
1859. Catalogue of the birds of New Mexico, as compiled from notes and observations made while in that Territory, during a residence of six years: Proc. Acad. Nat. Sci. Philadelphia, vol. 11, pp. 104-109.
- HENSHAW, HENRY WETHERBEE.
1874. Report upon ornithological specimens collected in the years 1871, 1872, and 1873: Geog. and geol. expl. and surv. west 100th meridian. First Lieut. Geo. M. Wheeler, corps of engineers, in charge (New Mexico birds, pp. 95-148).
1875. Report upon ornithological collections made in portions of Nevada, Utah, California, Colorado, New Mexico, and Arizona, during the years 1871, 1872, 1873, and 1874: Wheeler's rept. geog. and geol. expl. and surv. west 100th meridian, vol. 5, zoology, chap. 3, pp. 133-507; 15 pls.
1885-1886. List of birds observed in summer and fall on the upper Pecos River, New Mexico: The Auk, vol. 2, 1885, pp. 326-333; vol. 3, 1886, pp. 73-80.
1911 and 1914. Common birds of town and country (Washington, D. C., National Geographic Society, mainly reprinted from the National Geographic Magazine); 114 illustrations in color and 52 in black and white.
1913. Fifty common birds of farm and orchard: U. S. Dept. Agr. Farmers' Bull. 513, 31 pp.; 50 illus. (colored).
1915. American Game Birds: National Geographic Magazine, vol. 28, no. 2, pp. 105-158; 18 pls. (colored).
- HENSHAW, HENRY WETHERBEE, and others.
1918. The book of birds. Common birds of town and country, and American Game Birds; with chapters by Kennard, Cooke, and Shiras (Washington, D. C., National Geographic Society, mainly reprinted from the National Geographic Magazine), viii+195 pp.; 250 paintings by Louis Agassiz Fuertes.
1921. The storage of acorns by the California Woodpecker: The Condor, vol. 23, pp. 109-118; 1 photo.
- HERRICK, FRANCIS HOBART.
1901. The home life of wild birds. A new method of the study and photography of birds (New York and London, G. P. Putnam's Sons), xix+148 pp.; 141 photos.
1924a. An Eagle observatory: The Auk, vol. 41, pp. 89-105; 3 pls.
1924b. Nests and nesting habits of the American Eagle: The Auk, vol. 41, pp. 213-231; 3 pls.
1924c. The daily life of the American Eagle: Late phase: The Auk, vol. 41, pp. 389-422; 515-541; 10 pls.
- HERSEY, LUMAN JOEL, and ROBERT BLANCHARD ROCKWELL.
1907. A new breeding bird from Colorado: The Cassin Sparrow (*Peucaea cassini*) nesting near Denver: The Condor, vol. 9, pp. 191-194; 2 photos.
1909. An annotated list of the birds of the Barr Lake district, Adams County, Colorado: The Condor, vol. 11, pp. 109-122; 6 photos.

- HILL, GRACE A.
1922. With the Willow Ptarmigan: The Condor, vol. 24, pp. 105-108; 4 photos.
- HOFFMAN, WALTER JAMES.
1881. Birds of Nevada: Bull. Geol. and Geog. Surv., Territories ("Hayden Survey"), vol. 6, no. 2, pp. 203-256.
1924. Notes on the flight performance of the Wilson Snipe: The Condor, vol. 26, pp. 175-176.
- HOLLAND, HAROLD MAY.
1916. An unusual nest addition: The Condor, vol. 18, p. 31, 1 illus.
1926. Who would have thought it of Bubo? Bird-Lore, vol. 28, pp. 1-4; 1 photo.
- HOLLISTER, NED.
1920a. Segregation of male Mallards: The Condor, vol. 22, pp. 36-37.
1920b. Report of the superintendent of the National Zoological Park, for the fiscal year ending June 30, 1918: Ann. Rept. of Smithsonian Institution for year ending June 30, 1918, pp. 66-81.
- HOLMAN, F. C.
1926. Nesting of the California Pigmy Owl in Yosemite: The Condor, vol. 28, pp. 92-93.
- HOPKINS, CHARLES LINSLEY.
1888. Notes relative to the sense of smell in the Turkey Buzzard (*Cathartes aura*): The Auk, vol. 5, pp. 248-251.
- HORSFALL, ROBERT BRUCE.
1920. Remarkable habits of the Sage Grouse, as observed in Oregon in May, 1918: Zool. Soc. Bull. (New York, Zool. Soc.), vol. 23, pp. 3-6; drawings.
- HOWARD, OZRA WILLIAM.
1899a. Summer resident Warblers of Arizona: Bull. Cooper Orn. Club (= Condor vol. 1), pp. 37-40; 63-65; 2 photos.
1899b. Some of the summer Flycatchers of Arizona: Bull. Cooper Orn. Club (= Condor, vol. 1), pp. 103-107; 2 photos.
1900. Nesting of the Rivoli Hummingbird in southern Arizona: The Condor, vol. 2, pp. 101-102; 2 photos.
- HOWELL, ALFRED BRAZIER.
1916. Some results of a winter's observations in Arizona: The Condor, vol. 18, pp. 209-214.
1927. Poor-wills attracted by arc light: The Condor, vol. 29, p. 76.
- HOWLEY, JAMES P.
1884. The Canada Goose (*Bernicla canadensis*): The Auk, vol. 1, pp. 309-313.
- HUBBARD, MR. and MRS. FRANK DEXTER.
1924. A Cedar Waxwing patient: Bird-Lore, vol. 26, pp. 10-11; 2 figs.
- HUEY, LAURENCE MARKHAM.
1927. Birds recorded in spring at San Felipe, northeastern Lower California, Mexico, with the description of a new Woodpecker from that locality: Trans. San Diego Soc. Nat. Hist., 40 pp.; 3 pls.
- HUNT, RICHARD.
1922. Evidence of musical "taste" in the Brown Towhee: The Condor, vol. 24, pp. 193-203.
- HUXLEY, JULIAN SORRELL.
1916. Bird watching and biological science: The Auk, vol. 33, pp. 142-161, 256-269.
- IRVING, FRANK N.
1920. Importance of the blind in bird photography: The Condor, vol. 22, pp. 10-16; 6 photos.
- JAMES, EDWIN.
1823. Account of an expedition from Pittsburgh to the Rocky Mountains (compiled from the notes of Major Long, Thomas Say, and other members of the party): (Philadelphia, H. C. Carey and J. Lea), 3 vols., pp. 503 and 442, and atlas.

JAY, ANTONIN.

1911. Nesting of the California Cuckoo in Los Angeles County, California: The Condor, vol. 13, pp. 69-73; 3 photos.

JENSEN, JENS KNUDSEN.

- 1923a. Northern Shrike (*Lanius borealis*) near Santa Fe, New Mexico: The Auk, vol. 40, p. 333.
 1923b. Notes on the nesting birds of northern Santa Fe County, New Mexico: The Auk, vol. 40, pp. 452-469; 2 pls.
 1924a. The great Grosbeak year: The Auk, vol. 41, pp. 569-572.
 1924b. Kingbird (*Tyrannus tyrannus*) in New Mexico: The Auk, vol. 41, p. 603.
 1925a. Late nesting of the Scaled Quail: The Auk, vol. 42, pp. 129-130.
 1925b. Broad-tailed Hummingbird bathing in a swift-flowing mountain stream: The Auk, vol. 42, p. 588.
 1925c. English Sparrows and Robins: The Auk, vol. 42, p. 591.
 1925d. Mountain Chickadee with an adopted family: The Auk, vol. 42, p. 593.
 1926. Red-tailed Hawk killing snakes: The Auk, vol. 43, pp. 368-369.
 1928. Bird banding: New Mexico Conservationist, March, pp. 5-6.

JEWETT, STANLEY GORDON.

1928. Assistant parentage among birds: The Condor, vol. 30, pp. 127-128.

JOB, HERBERT KEIGHTLY.

1899. Some observations on the Anatidae of North Dakota: The Auk, vol. 16, pp. 161-165.
 1902. Among the Water-fowl. Observations, adventure, photography. A popular narrative account of the Water-fowl as found in the northern and middle States and lower Canada east of the Rocky Mountains (Garden City, N. Y., Doubleday, Page & Co.), 224 pp.; 98 photos.
 1905. Wild wings: Adventures of a camera-hunter among the larger wild birds of North America on sea and land. (Boston, Houghton Mifflin Co.), xxiv+341 pp.; pls., front.
 1908. The sport of bird study: (New York, The Outing Pub. Co.), 284+iv pp.; 272 photos.
 1914. In quest of the Canvasback: Outing, pp. 515-525; photos.

JOHNSON, CHARLES EUGENE.

1925. Kingfisher and Cooper's Hawk: The Auk, vol. 42, pp. 585-586.

JUDD, SYLVESTER DWIGHT.

- 1901a. The food of nestling birds: U. S. Dept. Agr. Yearbook, Separate 194, pp. 411-436; 5 pls., 9 figs.
 1901b. The relation of Sparrows to agriculture: Biol. Surv., U. S. Dept. Agr. Bull. 15, 98 pp.; 4 pls., 19 figs.
 1905a. The Bobwhite and other Quails of the United States in their economic relations: Biol. Surv., U. S. Dept. Agr., Bull. 21, 66 pp.; 2 colored pls., 10 figs.
 1905b. The Grouse and Wild Turkeys of the United States and their economic value: Biol. Surv., U. S. Dept. Agr., Bull. 24, 55 pp.; 2 pls. (1 colored).

KALMBACH, EDWIN RICHARD.

1914. Birds in relation to the alfalfa weevil: U. S. Dept. Agr. Bull. 107, 64 pp.; 5 pls., 3 figs.
 1916. Winter Crow roosts: U. S. Dept. Agr. Yearbook, Separate 659, 17 pp.; 2 pls., 1 map.
 1918. The Crow and its relation to man: U. S. Dept. Agr. Bull. 621, 92 pp.; 2 pls., 3 figs.
 1920. The Crow in its relation to agriculture: U. S. Dept. Agr. Farmers' Bull. 1102, 20 pp.; 4 figs.
 1927a. The Magpie in relation to agriculture: U. S. Dept. Agr. Technical Bull. 24, 30 pp.; 11 figs.
 1927b. Monetary value of Marsh Hawks: The Auk, vol. 44, pp. 100-101.

- KALMBACH, EDWIN RICHARD, and WALDO LEE MCATEE.
 1926. Homes for birds: U. S. Dept. Agr. Farmers' Bull. 1456., 22 pp.; 11 figs.
- KELLOGG, RALPH TODD.
 1923. Notes from Silver City: The Condor, vol. 25, p. 182.
- KEMPTON, RUSSELL MARSHALL.
 1927. Notes on the home life of the Turkey Vulture: The Wilson Bulletin, vol. 39, pp. 142-145.
- KEYES, CHARLES ROLLIN.
 1911. A history of certain Great Horned Owls: The Condor, vol. 13, pp. 1-19; 13 photos.
- KEYSER, LEANDER.
 1902. Birds of the Rockies (Chicago, A. C. McClurg & Co.), ix+535 pp.; 8 pls. (5 colored), text figs.
- KIBBE, AUGUSTUS SAYRE.
 1925. Aquatic visitors to Lake Merritt, Oakland, California: The Condor, vol. 27, pp. 55-58.
- KIMBALL, HENRY HUNGERFORD.
 1928. An abode of *Otus flammeolus*: The Condor, vol. 30, p. 129.
- KITCHIN, EDWARD ALEXANDER, and JOHN HOOKER BOWLES.
 1919. Nesting of the Short-eared Owl in western Washington: The Condor, vol. 21, pp. 21-25; 4 photos.
- KOBBE, WILLIAM HOFFMAN.
 1900. The Rufous Hummingbirds of Cape Disappointment: The Auk, vol. 17, pp. 8-15.
- LACEY, HOWARD.
 1911. The birds of Kerrville, Texas, and vicinity: The Auk, vol. 28, pp. 200-219.
- LAW, JOHN EUGENE.
 1926a. Green-tailed Towhee qualifies in intelligence test: The Condor, vol. 28, pp. 133-134.
 1926b. Juvenal House Wren reveals ancestral trait: The Condor, vol. 28, pp. 178-179.
- LEACH, FRANK ALEMAN.
 1925. Communism in the California Woodpecker: The Condor, vol. 27, pp. 12-19; 1 photo.
 1927. Strange features in bird habits: The Condor, vol. 29, pp. 233-238.
- LEISTER, CLAUDE WILLARD.
 1919. The Spotted Sandpiper: Bird-Lore, vol. 21, pp. 287-289; 3 photos.
- LEOPOLD, ALDO.
 1918. Are Red-headed Woodpeckers moving west? The Condor, vol. 20, pp. 122.
 1919a. Notes on the behavior of Pintail Ducks in a hailstorm: The Condor, vol. 21, p. 87.
 1919b. Notes on the weights and plumages of Ducks in New Mexico: The Condor, vol. 21, pp. 128-129.
 1919c. Notes on Red-headed Woodpecker and Jack Snipe in New Mexico: The Condor, vol. 21, p. 40.
 1919d. A breeding record for the Red-headed Woodpecker in New Mexico: The Condor, vol. 21, pp. 173-174.
 1919e. Differential sex migration of Mallards in New Mexico: The Condor, vol. 21, pp. 182-183.
 1921a. A hunter's notes on Doves in the Rio Grande Valley: The Condor, vol. 23, pp. 19-21.
 1921b. Weights and plumages of Ducks in the Rio Grande Valley: The Condor, vol. 23, pp. 85-86.
 1927. The whistling note of the Wilson Snipe: The Condor, vol. 29, pp. 79-80.
- LEOPOLD, N. F., JR.
 1923. Reason and instinct in bird migration: The Auk, vol. 40, pp. 409-414.

LIGON, JAMES STOKLEY.

1923. Nesting of the Evening Grosbeak in northern Michigan: *The Auk*, vol. 40, pp. 314-316; 1 pl.
 1926a. Nesting of the Great-tailed Grackle in New Mexico: *The Condor*, vol. 28, pp. 93-94.
 1926b. Habits of the Spotted Owl (*Syrnium occidentale*): *The Auk*, vol. 43, pp. 421-429.
 1927. Wild life of New Mexico: Its conservation and management (Santa Fe, State Game Commission), 212 pp.; photo., maps.

LINCOLN, FREDERICK CHARLES.

1922. Trapping Ducks for banding purposes, with an account of the results obtained from one waterfowl station: *The Auk*, vol. 39, pp. 322-344; 4 pls.
 1924a. Banding notes on the migration of the Pintail: *The Condor*, vol. 26, pp. 88-90.
 1924b. Returns from banded birds, 1920 to 1923: U. S. Dept. Agr. Bull. 1268, 55 pp.; illus.
 1924c. A "territory note" of the Belted Kingfisher: *The Wilson Bulletin*, vol. 36, pp. 113-115.
 1927a. A note on the longevity of the Pintail: *The Condor*, vol. 29, p. 115.
 1927b. Returns from banded birds, 1923 to 1926: U. S. Dept. Agr. Tech. Bull. 32, 96 pp.; 3 pls., 1 map.

LONG, STEPHEN HARRIMAN.

1923. See James, Edwin, 1833.

LORD, WILLIAM ROGERS.

1902. The Western Evening Grosbeak: *Bird-Lore*, vol. 4, pp. 9-11; 3 photos.

LUCAS, FREDERIC AUGUSTUS.

1891. On the structure of the tongues in Hummingbirds: *Proc. U. S. Nat. Mus.*, vol. 14, pp. 169-172.
 1897. The tongues of birds: *Rept. U. S. Nat. Mus. for 1895*, pp. 1001-1019.
 1900. Concerning birds' tongues: *Bird-Lore*, vol. 2, pp. 5-9; illus.

LUSE, RICHARD DEWITT.

1899. Nesting of the Sulphur-bellied Flycatcher: *Bull. Cooper Ornith. Club* (= *Condor*, vol. 1), pp. 112-113.
 1901. In the summer home of the Buff-breasted Flycatcher: *The Condor*, vol. 4, pp. 38-41; 1 photo.

MACKAY, GEORGE HENRY.

1893. Observations on the breeding habits of *Larus atricilla* in Massachusetts: *The Auk*, vol. 10, pp. 333-336.

MACOUN, JOHN, and JAMES MELVILLE MACOUN.

1909. Catalogue of Canadian birds: Canada Dept. of Mines, Geol. Surv. Branch, viii+761+xviii pp.

MAILLIARD, JOSEPH.

1906. Summer notes from a Santa Barbara garden: *The Condor*, vol. 8, pp. 45-50; 5 photos.
 1908. A migration wave of Varied Thrushes: *The Condor*, vol. 10, pp. 118-119.
 1921. Concerning incubation on the part of the male Belted Kingfisher: *The Condor*, vol. 23, pp. 194-195.
 1922. A Pigmy Owl bathing: *The Condor*, vol. 24, pp. 31-32.
 1926. Townsend Solitaire singing in the autumn: *The Condor*, vol. 28, p. 127.

McATEE, WALDO LEE.

1905. The Horned Larks and their relation to agriculture: *Biol. Surv.*, U. S. Dept. Agr., Bull. 23, 37 pp.; 2 pls., 13 figs.
 1908. Food habits of the Grosbeaks: *Biol. Surv.*, U. S. Dept. Agr., Bull. 32, 92 pp.; 4 pls. (3 colored), 40 figs.
 1911a. Our vanishing Shorebirds: *Biol. Surv.*, U. S. Dept. Agr., Circ. 79, 9 pp.; 3 pls.

McATEE, WALDO LEE—Continued.

- 1911b. Woodpeckers in relation to trees and tree products: Biol. Surv., U. S. Dept. Agr., Bull. 39, 99 pp.; 12 pls., 44 figs.
- 1911c. Our Grosbeaks and their value to agriculture: U. S. Dept. Agr. Farmers' Bull. 456, 11 pp.; 3 figs.
- 1912. Bird enemies of the codling moth: Reprint from U. S. Dept. Agr. Yearbook, Separate 564, pp. 237-246; 2 pls.
- 1915. Eleven important Wild Duck foods: U. S. Dept. Agr. Bull. 205, 25 pp., 23 figs.
- 1917. Propagation of Wild Duck foods: U. S. Dept. Agr. Bull. 465, 40 pp.; 35 figs.
- 1918. Food habits of the Mallard Ducks of the United States: U. S. Dept. Agr. Bull. 720, 35 pp.; 1 pl.
- 1920. Farm help from the birds: Separate 843, U. S. Dept. Agr. Yearbook, pp. 253-270; illus.
- 1922. Notes on food habits of the Shoveller or Spoonbill Duck (*Spatula clypeata*): The Auk, vol. 39, pp. 380-386.
- 1926. Hawk abundance and Hawk campaigns: The Auk, vol. 43, pp. 542-543.
- 1927a. Propagation of game birds: U. S. Dept. Agr. Farmers' Bull. 1521, 57 pp.; 27 figs.
- 1927b. Averages are fundamental in economic ornithology: Bird-Lore, vol. 29, pp. 97-99.

McCALL, GEORGE ARCHIBALD.

- 1851. Some remarks on the habits, etc., of birds met with in western Texas between San Antonio and the Rio Grande, and in New Mexico; with descriptions of several species believed to have been hitherto undescribed: Proc. Acad. Nat. Sci. Philadelphia, pp. 213-224.

McCONNELL, THOMAS LEO.

- 1921. Bird-house for Purple Martins: Bird-Lore, vol. 23, pp. 75-77.

McGREGOR, RICHARD CRITTENDEN.

- 1901. Dichromatism in the genus *Carpodacus*: The Condor, vol. 3, pp. 13-14.

McLEAN, DONALD DUDLEY.

- 1916. Nesting habits of the Virginia Rail in Mariposa County, California: The Condor, vol. 18, p. 229.

MERRIAM, CLINTON HART.

- 1884. The mammals of the Adirondack region, northeastern New York (New York, Press of L. S. Foster), reprint from Trans. Linnaean Society, N. Y., vols. 1 and 2, 316 pp.
- 1891. Results of a biological reconnaissance of Idaho south of latitude 45° and east of the 38th meridian, made during the summer of 1890 with annotated lists of the mammals and birds and descriptions of new species: North Amer. Fauna No. 5, 130 pp.; 2 pls.
- 1899. Results of a biological survey of Mt. Shasta, California: North Amer. Fauna No. 16, 179 pp.; 5 pls., 46 figs.

MERRIAM, FLORENCE AUGUSTA (see also BAILEY).

- 1896a. A-birding on a bronco (Boston, Houghton, Mifflin and Co.), 226 pp.; illus.
- 1896b. Nesting habits of *Phainopepla nitens* in California: The Auk, vol. 13, pp. 38-43.

MERRILL, JAMES CUSHING.

- 1888. Notes on the birds of Fort Klamath, Oregon: The Auk, vol. 5, pp. 138-145, 251-262, 357-366.

METZ, CHARLES W.

- 1908. The nesting of the Rocky Mountain Screech Owl in Wyoming: The Condor, vol. 10, pp. 143-145; 4 photos.

MICHAEL, CHARLES WILSON.

- 1926. Acorn storing methods of the California and Lewis Woodpecker: The Condor, vol. 28, pp. 68-69.
- 1927. Black Swifts nesting in Yosemite National Park: The Condor, vol. 29, pp. 89-97; 5 illus.

- MICHAEL, ENID.
1926a. Unusual behavior of an Ouzel: *The Condor*, vol. 28, p. 45.
1926b. The habits of the Swifts in Yosemite Valley: *The Condor*, vol. 28, pp. 109-114; 3 illus.
- MICHENER, HAROLD.
1925. Nuthatch in Pasadena develops trap habit: *The Condor*, vol. 27, pp. 38-39; 3 photos.
- MICHENER, HAROLD, and JOSEPHINE RIGDEN MICHENER.
1928. What color is the eye of a Bush-tit?: *The Condor*, vol. 30, pp. 133-135; 6 photos.
- MILLAIS, JOHN GUILLE.
1902. The natural history of British surface-feeding Ducks (London, Longmans, Green and Co.), xiv + 107 pp.; 72 illus.
1913. British diving Ducks (London, New York, Longmans, Green and Co.) 2 vols.; 74 pls. (39 colored).
- MILLER, ALDEN HOLMES.
1925. The boom-flight of the Pacific Nighthawk: *The Condor*, vol. 27 pp. 141-143; diagrams.
- MILLER, LOYE HOLMES.
1919. The marital tie in birds: *The Condor*, vol. 21, pp. 77-80.
1928. The antiquity of the migratory instinct in birds: *The Condor*, vol. 30, pp. 119-120.
- MILLER, OLIVE THORNE (MRS. HARRIET MANN).
1893. In nesting time (Boston, Houghton, Mifflin and Co.), 275 pp.
1894. A Bird-lover in the West (Boston, Houghton Mifflin and Co.), 278 pp.
1897. Upon the tree tops (Boston, Houghton, Mifflin and Co.), 245 pp.; 10 illus.
1904. With the birds in Maine (Boston, Houghton, Mifflin and Co.), 300 pp.
- MILLER, ROBERT CUNNINGHAM.
1923. A study of the flight of Sea Gulls: *The Condor*, vol. 25, pp. 5-15; 11 photos, 2 diagrams.
- MILLS, LAURA.
1925. White Pelicans in Nevada: *The Condor*, vol. 27, pp. 32-33; 1 photo.
- MINOT, HENRY DAVIS.
1880-1881. Notes on Colorado birds: *Bull. Nuttall Ornith. Club*, vol. 5, 1880, pp. 223-232; vol. 6, 1881, p. 89.
- MITCHELL, HORACE HEDLEY.
1924. Birds of Saskatchewan: *Canadian Field Naturalist*, vol. 38, no. 6, pp. 101-118; 6 photos.
- MOORE, ROBERT THOMAS.
1912. The Least Sandpiper during the nesting season in the Magdalen Islands: *The Auk*, vol. 29, pp. 210-223; 2 pls.
- MOUSLEY, WILLIAM HENRY.
1919. "The singing tree" or how near to the nest do the male birds sing? *The Auk*, vol. 36, pp. 339-348.
- MUIR, JOHN.
1894. The mountains of California (New York, The Century Co.), 381 pp.; illus.
1901. Our national parks (Boston, Houghton, Mifflin and Co.), 370 pp.; illus.
- MUNRO, JAMES ALEXANDER.
1919a. Notes on the breeding habits of the Red Crossbill in Okanagan Valley, British Columbia: *The Condor*, vol. 21, pp. 57-60.
1919b. Notes on some birds of the Okanagan Valley, British Columbia: *The Auk*, vol. 36, pp. 64-74.
- MUNSON, EDWARD LYMAN.
1907. *Ardea egretta* in New Mexico: *The Auk*, vol. 24, p. 212.
- MURPHY, ROBERT CUSHMAN.
1925. Bird islands of Peru, the records of a sojourn on the west coast (New York and London, G. P. Putnam's Sons), 362 pp.; photos.

MYERS, HARRIET WILLIAMS.

- 1907a. Nesting ways of the Western Gnatcatcher: The Condor, vol. 9, pp. 48-51.
- 1907b. Nesting habits of *Phainopepla nitens*: The Condor, vol. 9, pp. 101-103.
- 1908. Observations on the nesting habits of the Phainopepla: The Condor, vol. 10, pp. 72-75; 2 photos.
- 1909. Notes on the habits of *Phainopepla nitens*: The Condor, vol. 11, pp. 22-23.
- 1911. Nesting habits of the Western Flycatcher: The Condor, vol. 13, pp. 87-89; 1 photo.
- 1921. Winter bird life in Los Angeles: Bird-Lore, vol. 23, pp. 71-74; 3 photos.

NEILSON, JAMES ALEXANDER.

- 1926. Bird notes from Wheatland, Wyoming: The Condor, vol. 28, pp. 99-102.

NELSON, EDWARD WILLIAM.

- 1877. A contribution to the biography of the Wilson Phalarope: Bull. Nuttall Ornith. Club, vol. 2, pp. 38-43.
- 1887. Report upon natural history collections made in Alaska between the years 1877 and 1881; Arctic series, Signal Service, U. S. Army, Part I, Birds, pp. 19-226; 12 pls. (colored).
- 1891. Scott's Oriole (*Icterus parisorum*) in central New Mexico: The Auk, vol. 8, pp. 237-238.
- 1903. Notes on the Mexican Cormorant: The Condor, vol. 5, pp. 139-145; 5 photos.

NESBIT, WILLIAM.

- 1876. How to hunt with a camera (New York, E. P. Dutton & Co.), xiv+337 pp.; illus.

NICE, MARGARET MORSE.

- 1922-1923. A study of the nesting of Mourning Doves: The Auk, 1922, vol. 39, pp. 457-474, 1 pl.; 1923, vol. 40, pp. 37-58.

NICE, MARGARET MORSE, and LEONARD BLAINE NICE.

- 1921. The roadside census: The Wilson Bulletin, vol. 33, pp. 113-123.
- 1924. The birds of Oklahoma: Univ. Oklahoma Bull., new series no. 20, Univ. Studies No. 286, 122 pp.; 2 pls.

NICHOLS, JOHN TREADWELL, and FRANCIS HARPER.

- 1916. Field notes on some Long Island Shore Birds: The Auk, vol. 33, pp. 237-255; 7 pls.

NUTTALL, THOMAS.

- 1905. A popular handbook of the birds of the United States and Canada, new revised and annotated edition, by Montague Chamberlain (Boston, Little, Brown & Co.), Pt. I, Land birds, xlv+473 pp.; Pt. II, Game and Water Birds, ix+431 pp.; 20 pls. (colored), figs. in text.

OBERHOLSER, HARRY CHURCH.

- 1902. A review of the Larks of the genus *Otocoris*: Proc. U. S. Nat. Mus., vol. 24, pp. 801-884; 7 pls.
- 1906a. A revision of the Great Horned Owls: Proc. U. S. Nat. Mus., vol. 27, pp. 177-192.
- 1906b. The North American Eagles and their economic relations: Biol. Surv., U. S. Dept. Agr., Bull. 27, 31 pp.; 2 pls., 2 figs.
- 1914. A monograph of the genus *Chordeiles* Swainson, type of a new family of Goatsuckers: U. S. Nat. Mus., Bull. 86, vii+123 pp.; 6 pls.
- 1917. A remarkable Martin roost in the city of Washington: Bird-Lore, vol. 19, pp. 315-317.
- 1917-1928. The migration of North American birds: Bird-Lore, vols. 19-30 (still continuing).
- 1919. Another Purple Martin roost in the city of Washington: Bird-Lore, vol. 21, pp. 96-99.

- OBERHOLSER, HARRY CHURCH—Continued.
1923. Bird banding as an aid to the study of migration: *The Auk*, vol. 48, pp. 436-441.
- O'KANE, WALTER COLLINS.
1926. A Flicker movie with a hand camera: *Bird-Lore*, vol. 26, pp. 247-249; 2 photos.
- OSGOOD, WILFRED HUDSON.
1903. A list of birds observed in Cochise County, Arizona: *The Condor*, vol. 5, pp. 128-131, 149-151.
- PALMER, ROBERT HASTINGS.
1916. A visit to Hat and Egg Islands, Great Salt Lake: *The Auk*, vol. 18, pp. 113-123; 5 photos.
- PEARSON, THOMAS GILBERT.
1924. Herons of the United States: *Bull. 5, Nat. Assoc. Audubon Soc.*, 38 pp.; 4 pls. (colored), 13 figs.
- PEMBERTON, JOHN ROY.
1916. Variation of the broken-wing stunt by a Road-runner: *The Condor*, vol. 18, p. 203.
- PHILLIPS, JOHN CHARLES.
1922-1926. A natural history of the Ducks (Boston, Houghton Mifflin Co.): 4 quarto vols.; 102 pls. (mostly colored), 118 maps.
1928. Wild birds introduced or transplanted in North America: *U. S. Dept. Agr. Technical Bull. 61*, 64 pp.
- PICKWELL, GAYLE BENJAMIN.
1925. The nesting of the Killdeer: *The Auk*, vol. 42, pp. 485-496; 3 pls.
- PIERCE, FRED JOHN.
1922. The Prairie Chicken in east-central Iowa: *The Wilson Bulletin*, vol. 34, pp. 100-106.
- PIERCE, WRIGHT McEWEN.
1916. More bird notes from Big Bear Valley, San Bernardino Mountains: *The Condor*, vol. 18, pp. 177-182; 5 photos.
- PITTMAN, HAROLD HERBERT.
1925. The food of the Western Horned Owl: *Bird-Lore*, vol. 27, pp. 92-96; 3 photos.
1927. The Black Terns of Saskatchewan: *The Condor*, vol. 29, pp. 140-143; 3 photos.
- POOLE, EARL LINCOLN.
1925. A graphic method of recording flight: *The Auk*, vol. 42, pp. 209-216.
- POST, KATHERINE C.
1916. The Cedar Waxwing (*Bombycilla cedrorum*) during July and August, 1916: *The Wilson Bulletin*, vol. 28, pp. 175-193.
- PREBLE, EDWARD ALEXANDER.
1902. A biological investigation of the Hudson Bay region: *North Amer. Fauna No. 22*, 140 pp.; 14 pls., map.
1908. A biological investigation of the Athabaska-Mackenzie region: *North Amer. Fauna No. 27*, 574 pp.; 25 pls., 16 figs., map.
1926. The Western Meadowlark in northern British Columbia: *The Condor*, vol. 28, p. 96.
1927. A plea for our Hawks: *Nature Magazine*, January, pp. 30-32; colored pls. Reprinted, with revisions, as booklet, 24 pp.
- PRICE, WILLIAM WIGHTMAN.
1895. The nest and eggs of the Olive Warbler (*Dendroica olivacea*): *The Auk*, vol. 12, pp. 17-19.
1899. Some winter birds of the Lower Colorado Valley: *The Condor*, vol. 1, pp. 89-93.
- RACEY, KENNETH.
1926. Birds of the Alta Lake region, British Columbia: *The Auk*, vol. 43, pp. 319-325.

- RATHBUN, SAMUEL FREDERICK.
 1920. Bohemian Waxwing at Seattle, Washington, during the winter of 1919-20: *The Auk*, vol. 37, pp. 458-460.
 1925. The Black Swift and its habits: *The Auk*, vol. 42, pp. 497-516.
- RAY, MILTON SMITH.
 1912a. Through Tahoean Mountains: *The Condor*, vol. 14, pp. 12-14; 3 photos.
 1912b. The discovery of the nest and eggs of the California Pine Grosbeak: *The Condor*, vol. 14, pp. 157-187; 17 photos.
 1912c. Nesting of the Canada Goose at Lake Tahoe: *The Condor*, vol. 14, pp. 67-72.
 1913. Some further notes from the Tahoe region: *The Condor*, vol. 15, pp. 111-115; 2 photos.
 1914. Some discoveries in the forest at Fyffe: *The Condor*, vol. 16, pp. 57-70; 8 photos.
 1915. Nesting of the American Osprey at Eagle Lake, California: *The Condor*, vol. 17, pp. 70-74.
- RAY, ROSE CAROLYN.
 1925. Discovery of a nest and eggs of the Blue-throated Hummingbird: *The Condor*, vol. 27, pp. 49-51; 1 photo.
- REED, BESSIE PRICE.
 1925. Growth, development, and reactions of Great Horned Owls: *The Auk*, vol. 42, pp. 14-31; 2 pls.
- RICHARDS, GEORGE.
 1908. An unusual nesting locality for the Rocky Mountain Nuthatch: *The Condor*, vol. 10, pp. 194-196; 2 photos.
 1909. Cliff climbing for Prairie Falcon eggs: *The Condor*, vol. 11, pp. 164-166; 2 photos.
- RICHARDS, VIOLA F.
 1919. The early history of a Duck Hawk: *The Auk*, vol. 36, pp. 349-350; 2 pls.
- RIDGWAY, ROBERT.
 1877. United States Geological Exploration of the Fortieth Parallel. Part III, Ornithology: Professional Papers of the Engineer Department, U. S. Army, No. 18, pp. 303-669.
 1884. Description of a new species of Field Sparrow from New Mexico: *Proc. U. S. Nat. Mus.*, vol. 7, p. 259.
 1891. The Hummingbirds: *Rept. U. S. Nat. Mus.*, pp. 253-383; 46 pls., 47 figs.
 1900. Manual of North American birds (Philadelphia, J. B. Lippincott Co.), 2d ed., xiii+653 pp.; 464 outline drawings of generic characters.
 1901-1919. Birds of North and Middle America: *U. S. Nat. Mus. Bull.* 50, Parts I-VIII; outline drawings of Generic characters. (Still continuing.)
- RITTER, WILLIAM EMERSON.
 1921. Acorn storing by the California Woodpecker: *The Condor*, vol. 23, pp. 3-14; 4 photos.
 1922. Further observations on the activities of the California Woodpecker: *The Condor*, vol. 24, pp. 109-122.
- ROBERTS, THOMAS SADLER.
 1900. An account of the nesting habits of Franklin's Rosy Gull (*Larus franklinii*) as observed at Heron Lake in southern Minnesota: *The Auk*, vol. 17, pp. 272-283.
 1909. A study of a breeding colony of Yellow-headed Blackbirds; including an account of the destruction of the entire progeny of the colony by some unknown natural agency: *The Auk*, vol. 26, pp. 371-389; 10 pls.
 1919. Water Birds of Minnesota, past and present: *Bien. Rept. State Game and Fish Commission of Minnesota for July 31, 1918*, pp. 56-91.

ROCKWELL, ROBERT BLANCHARD.

- 1907a. The Woodhouse Jay in western Colorado: *The Condor*, vol. 9, pp. 81-84; 1 photo.
- 1907b. Some Colorado notes on the Rocky Mountain Screech Owl: *The Condor*, vol. 9, pp. 140-145; 5 photos.
1908. Nesting of the Western Horned Owl in Colorado: *The Condor*, vol. 10, pp. 14-17; 2 photos.
1909. The use of Magpies' nests by other birds: *The Condor*, vol. 11, pp. 90-92; 1 photo.
- 1910a. Some Colorado Night Heron notes: *The Condor*, vol. 12, pp. 113-121; 9 photos.
- 1910b. Nesting of the Gray-headed Junco: *The Condor*, vol. 12, pp. 164-165; 1 photo.
- 1910c. Nesting notes on the American Eared Grebe and Pied-billed Grebe: *The Condor*, vol. 12, pp. 188-193; 5 photos.
- 1911a. Nesting notes on the Ducks of the Barr Lake region: *The Condor*, vol. 13, pp. 121-128; 4 photos.
- 1911b. Notes on the nesting of the Forster and Black Terns in Colorado: *The Condor*, vol. 13, pp. 57-63; 7 photos.
1912. Notes on the Wading Birds of the Barr Lake region: *The Condor*, vol. 14, pp. 117-131; 13 photos.

ROWLEY, JOHN STUART.

1928. Western Winter Wren found breeding in Tulare County, California: *The Condor*, vol. 30, pp. 160-161.

RUST, HENRY JUDSON.

1914. Some notes on the nesting of the Sharp-shinned Hawk: *The Condor*, vol. 16, pp. 14-24; 8 photos.
1917. An annotated list of the birds of Fremont County, Idaho: *The Condor*, vol. 19, pp. 31-43; 12 photos, map.
1920. The home life of the Western Warbling Vireo: *The Condor*, vol. 22, pp. 85-94; 11 photos.

SAUNDERS, ARETAS ANDREWS.

1910. Bird notes from southwestern Montana: *The Condor*, vol. 12, pp. 195-204; 8 photos.
1911. A study of the nesting of the Cedar Waxwing: *The Auk*, vol. 28, pp. 323-329.
1912. A horseback trip across Montana: *The Condor*, vol. 14, pp. 215-220.
- 1913a. A study of the nesting of the Marsh Hawk: *The Condor*, vol. 15, pp. 99-104; 6 photos.
- 1913b. Some notes on the nesting of the Short-eared Owl: *The Condor*, vol. 15, pp. 121-125; 1 photo.
1914. The birds of Teton and northern Lewis and Clark Counties, Montana: *The Condor*, vol. 16, pp. 124-144; 10 photos.
1921. A distribution list of the birds of Montana, with notes on the migration and nesting of the better known species. Cooper Ornith. Club, Pacific Coast Avifauna No. 14, pp. 194; 35 figs., including map.
1923. Concerning the field identification of the Anatidae: *The Auk*, vol. 40, pp. 526-527.
- 1924a. The study of bird sounds: *The Condor*, vol. 26, pp. 209-213.
- 1924b. Recognizing individual birds by song: *The Auk*, vol. 41, pp. 242-259.

SAWYER, EDMUND JOSEPH.

1928. The courtship behavior of Barrow's Golden-eye (*Glaucionetta islandica*): *The Wilson Bulletin*, vol. 40, pp. 5-17; 5 illus.

SAYLES, IRA.

1887. The sense of smell in *Cathartes aura*: *The Auk*, vol. 4, pp. 51-56.

SCLATER, WILLIAM LUTLEY.

1912. A history of the birds of Colorado (London, Witherby & Co.), xxiv + 576 pp.; 17 pls., map.

SCOVILLE, SAMUEL, JR.

1927. Runaway days: (New York, Harcourt, Brace & Co.), 254 pp.

SENNETT, GEORGE BURRITT.

1879. Further notes on the ornithology of the Lower Rio Grande of Texas, from observations made during the spring of 1878: Bull. U. S. Geol. and Geog. Surv. Terrs., vol. 5, no. 3, pp. 372-440.

SETON, ERNEST THOMPSON (see Thompson).

1920. Why do birds bathe? Bird-Lore, vol. 22, pp. 334-335.

SETON, ERNEST THOMPSON, and FRANK MICHLER CHAPMAN.

1904. The Black Tern at home: Bird-Lore, vol. 6, pp. 1-5; 5 photos.

SETON-THOMPSON, ERNEST.

1891. Birds of Manitoba: Proc. U. S. Nat. Mus., vol. 13, no. 841, pp. 457-643.

1901. Recognition marks of birds: Bird-Lore, vol. 3, pp. 187-189; illus.

SHAW, WILLIAM THOMAS.

1908. The China or Denny Pheasant in Oregon, with notes on the native Grouse of the Pacific northwest (Philadelphia and London, J. B. Lippincott Co.), 24 pp.; 15 pls.

SHELDON, HARRY HARGRAVE.

1907. A collecting trip by wagon to Eagle Lake, Sierra Nevada Mountains: The Condor, vol. 9, pp. 185-191.

SHELTON, ALFRED COOPER.

1911. Nesting of the California Cuckoo: The Condor, vol. 13, pp. 19-22; 1 photo.

SHORGER, [ARLIE] WILLIAM.

1917. Feeding habit of the Sparrow Hawk: The Auk, vol. 34, p. 209.

SHUFELDT, ROBERT WILSON.

1887. Notes on *Melanerpes formicivorus* in New Mexico: The Auk, vol. 4, p. 345.

1889. Notes on sudden appearance in numbers of the Evening Grosbeak at Fort Wingate, New Mexico: The Auk, vol. 6, pp. 72-74.

SILLOWAY, PERLEY MILTON.

1900. Notes on the Long-billed Curlew: The Condor, vol. 2, pp. 79-82.

1903. Birds of Fergus County, Montana: Bull. 1, Fergus County Free High School, 77 pp.; photos.

1904. Afield at Flathead: The Condor, vol. 6, pp. 12-13; 1 photo.

1905. Notes from Flathead, 1904: The Condor, vol. 7, pp. 19-22; 1 photo.

1906. Among the Flathead birds: The Condor, vol. 8, pp. 109-110.

1907. Stray notes from the Flathead woods: The Condor, vol. 9, pp. 53-54.

1909. A problem of indeterminates: The Condor, vol. 11, pp. 86-90; 3 photos.

SIM, ROBERT J.

1923. The common Loon: Bird-Lore, vol. 25, pp. 167-175; 3 photos, 1 drawing.

SIMMONS, GEORGE FINLAY.

1925. Birds of the Austin region (Austin, University of Texas Press), xlii+387 pp.; illus.

SKINNER, MILTON PHILO.

1916. The Nutcrackers of Yellowstone Park: The Condor, vol. 18, pp. 62-64.

1917a. The Ospreys of the Yellowstone: The Condor, vol. 19, pp. 117-121; 1 photo.

1917b. The birds of Molly Island, Yellowstone National Park: The Condor, vol. 19, pp. 177-182; 2 photos.

1917c. Some birds of the Yellowstone: The Amer. Mus. Journ., vol. 17, pp. 129-134.

1921. Notes on the Rocky Mountain Jay in the Yellowstone National Park: The Condor, vol. 23, pp. 147-151.

1922. Notes on the Dipper in Yellowstone National Park: The Condor, vol. 24, pp. 18-21.

SKINNER, MILTON PHILO—Continued.

1925. The birds of Yellowstone National Park: Roosevelt Wild Life Bulletin, Syracuse University, N. Y. State College of Forestry, vol. 3, no. 1, 192 pp.; 2 pls. (colored), 47 figs., 2 maps.

1928. Kingfisher and Sharp-shinned Hawk: The Auk, vol. 45, pp. 100-101.

SMITH, AUSTIN PAUL.

1908a. Some data and records from the Whetstone Mountains, Arizona: The Condor, vol. 10, pp. 75-78.

1908b. Brain parasite in White-necked Raven: The Condor, vol. 10, p. 92.

1910. Miscellaneous bird notes from the Lower Rio Grande: The Condor, vol. 12, pp. 93-103.

SMITH, EMILY.

1928. Black Swifts nesting behind a waterfall: The Condor, vol. 30, pp. 136-138; 1 photo.

SNYDER, LESTER LYNNE.

1923. The Mourning Dove (*Zenaidura macroura carolinensis*) at Panora, Iowa: The Auk, vol. 40, pp. 240-244; 1 pl.

SPROT, GEORGE DOVETON.

1927. Notes on the courtship of the Rufous Hummingbird: The Condor, vol. 29, pp. 71-72.

STEELE, EDWARD SIMON.

1927. Food of the Spotted Owl: The Condor, vol. 29, pp. 123-124.

STEPHENS, FRANK.

1902. Eastern limit of Lawrence Goldfinch: The Condor, vol. 4, p. 17.

STONE, WITMER.

1922. Hawk flights at Cape May, New Jersey: The Auk, vol. 39, pp. 567-568.

1924. The ornithology of today and tomorrow (Cambridge, Fiftieth Anniversary, Nuttall Ornith. Club, December, 1923), pp. 7-25.

1927. Seton Gordon's Days with the Golden Eagle: The Auk, vol. 44, p. 578.

STONER, DAYTON.

1925-1926-1928. Observations and banding notes on the Bank Swallow: No. I, The Auk, vol. 42, 1925, pp. 86-94; 1 pl. No. II, vol. 43, 1926, pp. 198-213. No. III, vol. 45, 1928, pp. 41-45.

STORER, TRACY IRWIN.

1927. Three notable nesting colonies of the Cliff Swallow in California: The Condor, vol. 29, pp. 104-108; 3 photos.

STREET, JOHN FLETCHER.

1923. On the nesting grounds of the Solitary Sandpiper and the Lesser Yellow-legs: The Auk, vol. 40, pp. 577-583; 5 pls.

STRONG, REUBEN MYRON.

1912. Some observations on the life-history of the Red-breasted Merganser, *Mergus serrator*, Linn.: The Auk, vol. 29, pp. 479-488; 2 pls.

STUART, FRANK ALFRED.

1919. Purple Martins in Stuart acres: Bird-Lore, vol. 21, pp. 92-95; 3 photos.

SUTTON, GEORGE MIKSCH.

1915. Suggestive methods of bird-study: pet Road-runners: Bird-Lore vol. 17, pp. 57-61; 1 drawing.

1922. Notes on the Road-runner at Fort Worth, Texas: The Wilson Bulletin, vol. 34, pp. 3-20; 2 drawings.

1923. Notes on the nesting of the Wilson's Snipe in Crawford County, Pa.: The Wilson Bulletin, vol. 35, pp. 191-202; 3 illus.

1925a. Swimming and diving activity of the Spotted Sandpiper: The Auk, vol. 42, pp. 580-581.

1925b. Strange nesting site of the Chimney Swift (*Chaetura pelagica*): The Auk, vol. 42, pp. 586-587.

1925c. Notes on the nesting of the Goshawk in Pennsylvania: The Wilson Bulletin, vol. 37, pp. 193-199.

1927. Flocking, mating, and nest-building habits of the Prairie Horned Lark: The Wilson Bulletin, vol. 39, pp. 131-141.

SWARTH, HARRY SCHELWALDT.

1904. Birds of the Huachuca Mountains, Arizona: Cooper Ornith. Club, Pacific Coast Avifauna No. 4, 70 pp.
1905. Summer birds of the Papago Indian Reservation and of the Santa Rita Mountains, Arizona: The Condor, vol. 7, pp. 22-28, 47-50, 77-81.
1909. Distribution and molt of the Mearns Quail: The Condor, vol. 11, pp. 39-43; frontis., map, and 3 photos.
- 1911a. Birds and mammals of the 1909 Alexander Alaska expedition: Univ. Calif. Publ. Zool., vol. 7, no. 2, pp. 9-172; pls. 1-6, 3 figs. in text.
- 1911b. Field notes from south-central California: The Condor, vol. 13, pp. 160-163; 1 photo.
1914. A distributional list of the birds of Arizona: Cooper Ornith. Club, Pacific Coast Avifauna No. 10, pp. 133; map of life zones (colored).
1917. Geographical variation in *Sphyrapicus thyroideus*: The Condor, vol. 19, pp. 62-65.
1922. Birds and mammals of the Stikine River region of northern British Columbia and southeastern Alaska: Univ. Calif. Publ. Zool., vol. 24, no. 2, pp. 125-314.
1924. Birds and mammals of Skeena River region, northern British Columbia: Univ. Calif. Publ. Zool., vol. 24, no. 3, pp. 315-394; pls. 9-11, 1 fig.

SWENK, MYRON HARMON, and JANE BISHOP SWENK.

1928. Some impressions of the commoner winter birds of southern Arizona: The Wilson Bulletin, vol. 40, pp. 17-29.

TALBOT, LESTER RAYMOND.

1922. Bird-banding at Thomasville, Georgia, in 1922: The Auk, vol. 39, pp. 334-350; 3 pls.

TAVERNER, PERCY ALGERNON.

1906. The Yellow-breasted Chat: Bird-Lore, vol. 8, pp. 131-133; 1 drawing.
1919. The birds of the Red Deer River, Alberta: The Auk, vol. 36, pp. 1-21, 2 pls.; pp. 248-265.
1926. Birds of western Canada: Canada Department of Mines, Victoria Memorial Museum Bull. 41, 360 pp.; 84 pls.
1927. Some recent Canadian records: The Auk, vol. 44, pp. 217-228.

TAVERNER, PERCY ALGERNON, and BRADSHAW HALL SWALES.

1911. Notes on the migration of the Saw-whet Owl: The Auk, vol. 28, pp. 329-334.

TAYLOR, WALTER PENN.

1912. Field notes on amphibians, reptiles and birds of northern Humboldt County, Nevada, with a discussion of some of the faunal features of the region: Univ. Calif. Publ. Zool., vol. 7, no. 10, pp. 319-436; pls. 7-12.

TAYLOR, WALTER PENN, and WILLIAM THOMAS SHAW.

1924. The present status of the Band-tailed Pigeon on the Pacific Coast: California Fish and Game, vol. 10, pp. 1-9.
1927. Mammals and birds of Mount Rainier National Park: U. S. Dept. Int., 249 pp.; 109 figs., map.

THAYER, GERALD HENDERSON.

1909. Concealing-coloration in the animal kingdom. An exposition of the laws of disguise through color and patterns, being a summary of Abbott Henderson Thayer's discoveries (New York, The Macmillan Co.), xix+260 pp.; 16 pls., 140 figs.

THOMAS, GERALD BAMBER.

1908. The Mexican Black Hawk: The Condor, vol. 10, pp. 116-118; 1 photo.

THOMPSON, ERNEST EVAN SETON (see also Seton).

1891. The birds of Manitoba: Proc. U. S. Nat. Mus., vol. 13, no. 841, pp. 457-643; 1 pl.

THOMS, CRAIG SHARPE.

1924. The eastern and the western Meadowlarks: Bird-Lore, vol. 26, pp. 315-317; 4 photos.

THOMSON, ARTHUR LANDSBOROUGH.

1926. Problems of bird migration: (London, H. F. and G. Witherby), xv + 350 pp.; maps and diagrams.

THURBER, EUGENE CARLTON.

1890. *Callipepla squamata* in northeastern New Mexico: The Auk, vol. 7, pp. 89-90.

TORREY, BRADFORD.

1901. Everyday birds (Boston, Houghton Mifflin Co.), 103 pp.; 12 pls.
1904. Nature's invitation (Boston, Houghton Mifflin Co.), 300 pp.
1913. Field days in California (Boston, Houghton Mifflin Co.), 235 pp.; portrait and 8 photos.

TOWNSEND, CHARLES WENDELL.

1910. The courtship of Golden-eye and Eider Ducks: The Auk, vol. 27, pp. 177-181.
1916. The courtship of the Merganser, Mallard, Black Duck, Baldpate, Wood Duck and Bufflehead: The Auk, vol. 33, pp. 9-17.
1918. A winter Crow roost: The Auk, vol. 35, pp. 405-416.
1920. Courtship in birds: The Auk, vol. 37, pp. 380-393.
1925a. Courtship of the Ruddy Duck and of the Coot: Bull. Essex County [Mass.] Ornith. Club, vol. 7, no. 1, pp. 5-6.
1925b. The courtship of the Brandt Cormorant: The Condor, vol. 27, pp. 92-93.
1927. Notes on the courtship of the Lesser Scaup, Everglade Kite, Crow, and Boat-tailed and Great-tailed Grackles: The Auk, vol. 44, pp. 549-554.

TRAFTON, GILBERT HAVEN.

1910. Methods of attracting birds (Boston, Houghton Mifflin Co.), xv + 171 pp.; illus.

TREGANZA, EDWARD, and ALBERT OWEN.

1913. The Rocky Mountain Pine Grosbeak in Utah: The Condor, vol. 15, pp. 106-110; 3 photos.

TURNER, LUCIEN MCSHAN.

1886. Contributions to the natural history of Alaska: Results of investigations made chiefly in the Yukon district and the Aleutian Islands: Signal Service, U. S. A., May, 1874, to August, 1881. No. II, Part V, Birds, pp. 115-196; 10 pls. (colored).

TYLER, JOHN GRIPPER.

1910. The Brewer Sparrow (*Spizella breweri*) in Fresno County, California: The Condor, vol. 12, pp. 193-195.
1913. Some birds of the Fresno district, California: Cooper Ornith. Club. Pacific Coast Avifauna no. 9, 114 pp.
1923. Observations on the habits of the Prairie Falcon: The Condor, vol. 25, pp. 90-97; 3 photos.

TYLER, WINSOR MARRETT.

1914. Notes on the nest life of the Brown Creeper in Massachusetts: The Auk, vol. 31, pp. 50-62.
1916. The call notes of some nocturnal migrating birds: The Auk, vol. 33, pp. 132-141.

URNER, CHARLES ANDERSON

1923. Notes on the Short-eared Owl: The Auk, vol. 40, pp. 30-36.
1925. Notes on two ground-nesting Birds of Prey: The Auk, vol. 42, pp. 31-41; 2 pls.

VAN ROSSEM, ADRIAAN JOSEPH.

1923. A study of some plumages of the Black Tern: The Condor, vol. 25, pp. 208-213; 2 photos.
1927. Eye shine in birds, with notes on the feeding habits of some Goat-suckers: The Condor, vol. 29, pp. 25-28.

VON BLOEKER, JOHN CHRISTIAN, JR.

1928. Flycatching habits of the Western Tanager: *The Condor*, vol. 30, pp. 125-126.

VROOMAN, ALBERT GEORGE.

1901. Discovery of the egg of the Black Swift (*Cypseloides niger borealis*): *The Auk*, vol. 18, pp. 394-395.
1905. Discovery of a second egg of the Black Swift: *The Condor*, vol. 7, pp. 176-177.

WALES, JOSEPH HOWE.

1926. The coo of the Band-tailed Pigeon: *The Condor*, vol. 28, pp. 31-32; 1 photo.

WALKER, ERNEST PILLSBURY.

1927. True economic status of the Alaska Bald Eagle: *Bird-Lore*, vol. 29, pp. 157-160.

WARD, HENRY BALDWIN.

1924. Banding White Pelicans: *The Condor*, vol. 26, pp. 136-140; map.

WARREN, EDWARD ROYAL.

1907. Photographing Magpies: *The Condor*, vol. 9, pp. 9-12; 7 photos.
1912. Some north-central Colorado bird notes: *The Condor*, vol. 14, pp. 83-104; 12 photos, map.
1919. Bird notes of a stormy May in Colorado Springs: *The Condor*, vol. 21, pp. 62-65; 1 photo.

WATSON, JOSEPH RALPH.

1910. The impaling instinct in Shrikes: *The Auk*, vol. 27, p. 459.

WELCH, JOHN M.

1899. Notes on Lewis Woodpecker: *Bull. Cooper Ornith. Club* (= *Condor*, vol. 1), p. 29.

WETMORE, [FRANK] ALEXANDER.

1909. Fall notes from eastern Kansas: *The Condor*, vol. 11, pp. 154-164.
1915. Mortality among Waterfowl around Great Salt Lake, Utah: *U. S. Dept. Agr. Bull.* 217, 10 pp.; 3 pls.
1918a. The Duck sickness in Utah: *U. S. Dept. Agr. Bull.* 672, 26 pp.; 4 pls.
1918b. A note on the tracheal air-sac in the Ruddy Duck: *The Condor*, vol. 20, pp. 19-20.
1919a. Notes on the structure of the palate in the Icteridae: *The Auk*, vol. 36, pp. 190-197; 2 figs.
1919b. Lead poisoning in Waterfowl, *U. S. Dept. Agr. Bull.* 793, 12 pp.; 2 pls.
1920a. Observations on the habits of birds at Lake Burford, New Mexico: *The Auk*, vol. 37, pp. 221-247, 3 pls., and pp. 393-412.
1920b. Observations on the habits of the White-winged Dove: *The Condor*, vol. 22, pp. 140-146.
1920c. The function of powder downs in Herons: *The Condor*, vol. 22, pp. 168-172; 2 photos.
1920d. The wing claw in Swifts: *The Condor*, vol. 22, pp. 197-199.
1921. Wild Ducks and duck foods of the Bear River Marshes, Utah: *U. S. Dept. Agr. Bull.* 936, 20 pp.; 4 pls.
1923. Migration records from wild Ducks and other birds banded in the Salt Lake Valley, Utah: *U. S. Dept. Agr. Bull.* 1145, 16 pp., 2 pls.
1924. Food and economic relations of North American Grebes: *U. S. Dept. Agr. Bull.* 1196, 24 pp.; 4 figs.
1925. Food of American Phalaropes, Avocets, and Stilts: *U. S. Dept. Agr. Bull.* 1359, 20 pp.; 3 pls.
1926a. The migrations of birds (Cambridge, Harvard University Press), viii+217 pp.; 7 figs.
1926b. Observations on the birds of Argentina, Paraguay, Uruguay, and Chile: *U. S. Nat. Mus. Bull.* 133, iv+448 pp.; 20 pls.
1927a. Our migrant Shorebirds in southern South America: *U. S. Dept. Agr. Technical Bull.* 26, 24 pp.; 6 figs.

- 1927b. Scientific survey of Porto Rico and the Virgin Islands (New York, New York Academy of Sciences), vol. 9, Parts 3 and 4, The Birds, pp. 245-598+xiii; 11 pls., 19 figs. (including map).
- 1927c. Present status of the check-list of fossil birds for North America: The Auk, vol. 44, pp. 179-183.
- WEYDEMEYER, WINTON.
1923. Notes on the song and the nest of the Ruby-crowned Kinglet: The Condor, vol. 25, pp. 117-118.
- WHEELER, WILLIAM CUMMINGS, and JOHN TREADWELL NICHOLS.
1924. The song of the Song Sparrow (a systematic study of its construction): The Auk, vol. 41, pp. 444-451; 1 fig.
- WHITNEY, THOMAS HAYES.
1925. Martins and Martin houses: The Wilson Bulletin, vol. 37, pp. 65-72.
- WHITTLE, CHARLES LIVY.
1923. Some aspects of the group habit among birds: The Auk, vol. 40, pp. 224-240.
1926a. Notes on the nesting habits of the Tree Swallow: The Auk, vol. 43, pp. 247-248.
1926b. On the nature of the relationship existing among land birds during sustained aerial migration: The Auk, vol. 43, pp. 493-500.
- WHITTLE, CHARLES LIVY, and LAURENCE B. FLETCHER.
1924. Further observations on the group habit in birds: The Auk, vol. 41, pp. 327-333.
- WHITTLE, HELEN GRANGER (MRS. CHARLES LIVY WHITTLE).
1923. Recent experiences with nesting Catbirds: The Auk, vol. 40, pp. 603-606.
- WHITMAN, F. N.
1919. A visit with Cedar Waxwings: Bird-Lore, vol. 21, pp. 293-295; 4 photos.
- WILLARD, FRANCIS CATTLE.
1899. Nesting of the Water Ouzel: Bull. Cooper Ornith. Club (=Condor, vol. 1), pp. 23-24.
1908. Three Vireos: Nesting notes from the Huachuca Mountains: The Condor, vol. 10, pp. 230-234.
1909a. Behavior of a young Rivoli Hummingbird: The Condor, vol. 11, pp. 102-103.
1909b. Nesting of the Arizona Junco: The Condor, vol. 11, pp. 129-131; 1 photo.
1909c. The Flammulated Screech Owl: The Condor, vol. 11, pp. 199-202.
1910a. Nesting of the Western Evening Grosbeak: The Condor, vol. 12, pp. 60-62; 1 photo.
1910b. The Olive Warbler (*Dendroica olivacea*) in southern Arizona: The Condor, vol. 12, pp. 104-107; 2 photos.
1911. The Blue-throated Hummingbird: The Condor, vol. 13, pp. 46-49.
1912a. A week afield in southern Arizona: The Condor, vol. 14, pp. 53-63; 1 photo.
1912b. Breeding of the Scott Sparrow: The Condor, vol. 14, pp. 195-196.
1912c. Migration of White-necked Ravens: The Condor, vol. 14, pp. 107-108.
1912d. Nesting of the Rocky Mountain Nuthatch: The Condor, vol. 14, pp. 213-215; 2 photos.
1913. Late nesting of certain birds in Arizona: The Condor, vol. 15, p. 227.
1916a. Nesting of the Band-tailed Pigeon in southern Arizona: The Condor, vol. 18, pp. 110-112; 1 photo.
1916b. On bicycle and afoot in the Santa Catalina Mountains: The Condor, vol. 18, pp. 156-160.
1918. Evidence that many birds remain mated for life: The Condor, vol. 20, pp. 167-170.
1923. The Buff-breasted Flycatcher in the Huachuclas: The Condor, vol. 25, pp. 189-194; 4 photos.

WILLETT, GEORGE, and ANTONIN JAY.

1911. May notes from San Jacinto Lake: *The Condor*, vol. 13, pp. 156-160; 3 photos.

WILLIAMS, LAIDLAW.

1927. From seacoast to sage-brush: *Bird-Lore*, vol. 29, pp. 174-178.

WILSON, FRANK NORMAN.

1927. A citizen of the marshes: *Bird-Lore*, vol. 29, pp. 397-402; 3 photos.

WITHERBY, HARRY FORBES.

- 1919-1924. A practical handbook of British birds, edited by H. F. Witherby (London, H. F. and G. Witherby), vol. 1, 1919, 532 pp., 17 pls.; vol. 2, 1920-1924, 959 pp., 13 pls.

WOODCOCK, ARTHUR ROY.

1902. Annotated list of the birds of Oregon: *Oreg. Agr. Exp. Sta.*, Corvallis, Bull. 68, 117 pp.; 1 fig.

WOODHOUSE, SAMUEL WASHINGTON.

1854. Report of an expedition [Sitgreaves'] down the Zuni and Colorado Rivers, 1851. *Birds*, pp. 58-105.

WOODRUFF, FRANK MORLEY.

1923. Conditions of the breeding Game Birds of North Dakota, Expedition Chicago Acad. of Sciences: *Wilson Bulletin*, vol. 35, pp. 4-20; 21 photos.

WOODS, ROBERT S.

1922. The development of young Costa Hummingbirds: *The Condor*, vol. 24, pp. 189-193; 4 photos.

1923. Further observations on the Costa Hummingbird: *The Condor*, vol. 25, pp. 195-198; 3 photos.

- 1924a. Notes on the life history of the Texas Nighthawk: *The Condor*, vol. 26, pp. 3-6; 4 photos.

- 1924b. Some birds of the San Gabriel wash: *Bird-Lore*, vol. 26, pp. 1-9; 8 photos.

1927. The Hummingbirds of California: *The Auk*, vol. 44, pp. 297-318; 3 pls.

WRIGHT, ALBERT HAZEN.

- 1914-1915. Early records of the Wild Turkey: *The Auk*, vol. 31, pp. 334-358, 1914; vol. 32, pp. 61-81, 207-224, 348-366, 1915.

WUESTA, RUDOLPH CHARLES.

1902. A few notes on the nesting of *Trochilus alexandri*: *The Condor*, vol. 4, pp. 39-40.

WYTHER, MARGARET WILHELMINA.

1916. Nesting of the Tolmie Warbler in Yosemite Valley: *The Condor*, vol. 18, pp. 123-127.

ZIEGLER, GEORGE FREDERICK.

1923. Notes on a Purple Martin colony: *The Auk*, vol. 40, pp. 431-436.

PERIODICALS

Auk, The: Scientific and popular articles, short notes, recent literature, obituaries, etc. For subscriptions and index to Bull. Nutt. Ornith. Club, and The Auk, Vol. I-XLIV (1876-1927), address W. L. McAtee, Business Manager, 200 Cedar St., Cherrydale, Virginia.

Bird-Lore: Popular (containing Audubon Society School Department), Harrisburg, Pennsylvania.

Condor, The: A magazine of Western Ornithology, with book reviews and minutes of Cooper Club meetings. W. Lee Chambers and Harry Harris, Business Managers, Box 123, Eagle Rock, California.

Nature Magazine: Popular (containing articles on plants, stars, birds, mammals, reptiles, fishes, insects and other invertebrates). Amer. Nature Assoc., 1214 16th St. N. W., Washington, D. C.

Wilson Bulletin, The: Popular and scientific articles and notes on birds. Secretary, Howard K. Gloyd, Ottawa, Kansas.

For a list of free publications of the Biological Survey relating to birds, address Bureau of Biological Survey, U. S. Department of Agriculture, Washington, D. C.

For a list of government publications on birds for sale by the Superintendent of Documents, address Government Printing Office, Washington, D. C.

ABBREVIATIONS

- Acad. Nat. Sci. Philadelphia*—Academy of Natural Sciences, Philadelphia.
Amer. Mus. Nat. Hist.—American Museum of Natural History, New York.
Amer. Nat.—American Naturalist, Science Press, New York.
Ann. Rept.—Annual Report.
Bien. Rept.—Biennial Report.
Biol. Surv.—Biological Survey, Washington, D. C.
Cooper Orn. Club.—Cooper Ornithological Club.
Geog. and Geol. Expl. and Survs. W. of 100th Merid.—Geographical and Geological Exploration and Surveys West of 100th Meridian.
Mus. Comp. Zool.—Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
Mus. Vert. Zool.—Museum of Vertebrate Zoology, Berkeley, California.
Nat. Assoc. Audubon Soc.—National Association of Audubon Societies, 1974 Broadway, New York.
Nuttall Orn. Club.—Nuttall Ornithological Club.
Pac. R. Rept.—Pacific Railroad Report.
Proc. Calif. Acad. Sci.—Proceedings California Academy of Sciences, San Francisco, California.
U. S. Dept. Agr.—United States Department of Agriculture, Washington, D. C.
U. S. Nat. Mus.—United States National Museum, Washington, D. C.
Univ. Calif. Publ. Zool.—University of California Publications in Zoology, Berkeley, California.

INDEX

[Principal references to species are given in **bold-face figures**; names of authors will be found under Literature Cited.]

- Abert, J. W., 17
 Abert Towhee, 6, **718**
 Acanthylis saxatilis, 12, **351**
 Acknowledgments, 1
 Accipiter cooperi, **160**
 velox, **157**
 Actitis macularia, **264**
 Aechmophorus occidentalis, **79**
 Aegialitis vocifera, **768**
 Aeronautes melanoleucus, 12
 saxatilis, **351**
 Agelaius phoeniceus fortis, **647**
 phoeniceus nevadensis, **647**
 phoeniceus sonoriensis, **646**
 Aiken, C. E. H., 13, 22
 Aiken Screech Owl, **318**
 Aimophila ruficeps scotti, **730**
 Aix sponsa, **130**
 Alaska Hermit Thrush, **570**
 Willow Ptarmigan, 206
 Yellow Warbler, **615**
 Alpine Three-toed Woodpecker, 8, **411**
 American Avocet, **281**
 Barn Owl, **315**
 Bittern, **96**
 Black-bellied Plover, **254**
 Black Tern, **294**
 Coot, **243**
 Dipper, **531**
 Eared Grebe, **76**
 Golden-eye, **139**
 Long-eared Owl, **332**
 Magpie, 7, **481**
 Merganser, **147**
 Osprey, **184**
 Pintail, **118**
 Pipit, **588**
 Raven, **487**
 Redstart, **633**
 Rough-legged Hawk, **170**
 Scaup Duck, **136**
 White Pelican, **83**
 Ammodramus bairdi, **723**
 savannarum bimaculatus, **722**
 Amphispiza bilineata deserticola, **732**
 nevadensis nevadensis, **734**
 Anas diazi novimexicana, 11, **114**
 platyrhynchos platyrhynchos, **109**
 Anderson, W. W., 13, **21**
 Anhinga anhinga, **86**
 Anser albifrons gambeli, 12, **107**
 frontalis, 12
 Anthony, A. W., 13, **23**
 Anthus spinoletta rubescens, **588**
 Antrostomus vociferus arizonae, **339**
 Aphelocoma californica woodhousei, **476**
 sieberi arizonae, **479**
 woodhousei, 12
 Aplomado Falcon, 6, **191**
 Aquila chrysaetos, **176**
 Archilochus alexandri, **354**
 Arctic Towhee, **712**
 Ardea egretta, **781**
 herodias treganzai, **87**
 Arizona Blue Grosbeak, **677**
 Blue-throated Hummingbird, **370**
 Cardinal, **670**
 Crested Flycatcher, **423**
 Hepatic Tanager, **666**
 Hooded Oriole, 6, **652**
 Jay, **479**
 Junco, **740**
 Least Vireo, **601**
 Pyrrhuloxia, 6, **672**
 Scaled Quail, 6, 7, **215**
 Spotted Owl, 7, **330**
 Woodpecker, 7, **410**
 Arkansas Goldfinch, 7, **703**
 Kingbird, 7, **416**
 Ash-throated Flycatcher, 7, **424**
 Ashy Ruby-crowned Kinglet, **586**
 Asio flammeus, **334**
 wilsonianus, **332**
 Astragalinus lawrencei, **705**
 psaltria hesperophilus, **704**
 psaltria psaltria, **703**
 tristis pallidus, **702**
 Astur atricapillus striatulus, **156**
 Asturina plagiata, **175**
 Asyndesmus lewisi, **390**
 Audubon Caracara, 6, **186**
 Hermit Thrush, 8, **571**
 Warbler, 7, **616**
 Auriparus flaviceps flaviceps, **514**
 Avocet, American, **281**
 Baeolophus inornatus griseus, **510**
 wollweberi annexus, **513**
 Bailey, Florence M., 23
 Vernon, **23**
 Baird Bewick Wren, 7, **538**
 Sandpiper, **273**
 Sparrow, **723**
 Balanospheya formicivora aculeata, **386**
 Bald Eagle, **180**

- Baldpate, 116
 Band-tailed Pigeon, 7, 10, 296
 Bank Swallow, 457
 Barber, C. M., 13, 28
 Barn Owl, 6
 Swallow, 459
 Barrell, R. W., 27
 Bartramia longicauda, 262
 Batchelder, C. F., 13, 22
 Batchelder Woodpecker, 404
 Belted Kingfisher, 373
 Bendire, C. E., 13
 Bendire Crossbill, 706
 Thrasher, 6, 557
 Bergtold, W. H., 31
 Bernicla canadensis, 776
 Birds first described from New Mexico, 11
 Birdseye, Clarence, 32
 Birtwell, F. J., 13, 29
 Bittern, American, 96
 Least, 97
 Black Curlew, 101
 Darter, 86
 Phoebe, 6, 433
 Rosy Finch, 8, 697
 Blackbird, Brewer, 656
 Yellow-headed, 7, 642
 Blackburnian Warbler, 620
 Black-chinned Hummingbird, 7, 354
 Sparrow, 7, 750
 Black-crowned Night Heron, 93
 Blackhead, 137
 Black-headed Grosbeak, 7
 Black-necked Grebe, 77
 Stilt, 283
 Black-poll Warbler, 620
 Black-throated Blue Warbler, 615
 Black-throated Desert Sparrow, 732
 Black-throated Gray Warbler, 7, 622
 Blinn, E. P., 27
 Blue Corporal, 192
 Quail, 216, 217
 Bluebill, 137
 Bluebird, 573
 Chestnut-backed, 7, 573
 Mountain, 8, 576
 Blue-throated Hummingbird, 7
 Blue-winged Teal, 124
 Bobolink, 637
 Bob-white, Texas, 6, 213
 Bohemian Waxwing, 591
 Bombycilla cedrorum, 592, 783
 garrula pallidiceps, 591
 Bonnet Martyr, 92
 Botaurus lentiginosus, 96
 Branta canadensis canadensis, 104
 canadensis hutchinsi, 106
 Brewer Blackbird, 656
 Sparrow, 7, 747
 Bridled Titmouse, 7, 513
 Broad-bill, 129
 Broad-billed Hummingbird, 369
 Broad-tailed Hummingbird, 8, 357
 Bronze Curlew, 101
 Brown-capped Rosy Finch, 8, 698
 Bubo virginianus occidentalis, 324
 virginianus pallescens, 320
 Buff-breasted Flycatcher, 7, 440
 Buffle-head, 141
 Bullet Hawk, 192
 Bullock Oriole, 7, 654
 Bush-tit, Lead-colored, 7, 517
 Lloyd, 7, 520
 Bunting, Lark, 7, 719
 Lazuli, 7, 678
 Painted, 6, 680
 Burrowing Owl, 6, 7, 327
 Buteo albonotatus albonotatus, 165
 borealis calurus, 11, 161
 lineatus elegans, 164
 oxypterus, 12, 169
 swainsoni, 12, 167, 169
 Butorides virescens virescens, 92
 Butter-ball, 142
 Cactus Woodpecker, 6, 407
 Wren, 6, 540
 Calamospiza melanocorys, 719
 Calcarius ornatus, 12, 762
 California Cuckoo, 7, 308
 Calliope Hummingbird, 8, 366
 Callipepla squamata, 789
 squamata pallida, 215
 Calliphortyx, 221
 Calypte costae, 355
 Canada Goose, 104
 Canadian Curlew, 261
 Canvasback, 134
 Canyon Towhee, 7, 714
 Wren, 6, 545
 Capella delicata, 256
 Cardellina rubrifrons, 630
 Cardinal, Arizona, 670
 Gray-tailed, 6, 671
 Carolina Wren, 538
 Carpodacus cassinii, 688
 familiaris, 12
 mexicanus frontalis, 12, 689
 obscurus, 12
 Cassin Kingbird, 6, 419
 Purple Finch, 8, 688
 Sparrow, 6, 731
 Vireo, 602
 Catbird, 7, 554
 Cathartes aura, 776, 785
 aura septentrionalis, 151

- Catherpes mexicanus conspersus*, 545
Catoptrophorus semipalmatus inornatus, 267
 Cedar Waxwing, 592
Centrocercus urophasianus, 211
Centurus uropygialis uropygialis, 381
Ceophloeus pileatus abieticola, 380
Certhia familiaris albescens, 527
 familiaris montana, 528
 Cerulean Warbler, 619
Chaetura pelagica, 350, 787
Chamaepelia passerina pallescens, 305
Charadrius nivosus, 247
Charitonetta albeola, 141
 Chat, Long-tailed, 7, 629
Chaulelasmus streperus, 115
Chen hyperboreus hyperboreus, 107
 Chestnut-backed Bluebird, 7, 573
 Chestnut-collared Longspur, 762
 Chickadee, Long-tailed, 8, 506
 Mexican, 7, 508
 Mountain, 7, 508
 Chicken Hawk, 163
 Chihuahua Horned Lark, 6, 452
 Woodpecker, 404
 Chimney Swift, 350
Chlidonias nigra surinamensis, 294
Chloroceryle americana septentrionalis, 376
Chondestes grammacus strigatus, 727
Chordeiles acutipennis texensis, 346
 minor henryi, 12, 342
 minor hesperis, 345
 minor howelli, 346
Cinclus mexicanus, 768
 mexicanus unicolor, 531
 Cinnamon Teal, 7, 126
Circus hudsonius, 181
Clangula clangula americana, 767
 Clark Nutcracker, 501
 Clay-colored Sparrow, 747
 Cliff Swallow, 462
 Coale, H. K., 27
Coecothraustes vespertinus, 766
Coecyzus americanus occidentalis, 308
Colaptes auratus, 763
 cafer, 763
 cafer collaris, 377
Colinus virginianus texanus, 213
Columba fasciata fasciata, 296
 Columbian Sharp-tailed Grouse, 209
Colymbus auritus, 75
 nigricollis californicus, 76
 Conservation organizations, 10
 Cooper Hawk, 7, 160
 Summer Tanager, 7, 668
 Coot, American, 243
 Coppery-tailed Trogon, 372
 Cormorant, Mexican, 84
 Coronado, Francisco Vazquez de, 15
Corthylia calendula cinerascens, 586
Corvus brachyrhynchos hesperis, 772, 494
 corax sinuatus, 487
 cryptoleucus, 489
 Costa Hummingbird, 6, 355
 Cotton Top, 216
 Coues, Elliott, 13, 21
 Coues Flycatcher, 442
 Cowbird, 659
 Dwarf, 663
 Sagebrush, 662
 Crane, Gopher, 89
 Little Brown, 238
 Sandhill, 239
 Whooping, 237
 Creek Duck, 116
 Creeper, Mexican, 527
 Rocky Mountain, 8, 528
 Crissal Thrasher, 6, 558
Crocethia alba, 280
 Crossbill, Bendire, 706
 Mexican, 8, 707
 Crow, Western, 7, 494
Cryptoglaux acadica acadica, 337
 Cuckoo, California, 7, 308
 Yellow-billed, 308
 Curlew, Black, 101
 Bronze, 101
 Canadian, 261
 Eskimo, 261
 Hudsonian, 261
 Long-billed, 7, 258
 Curve-billed Thrasher, 6, 555
Cyanocephalus cyanocephalus, 12, 497
Cyanocitta cristata bromia, 473
 macrolopha, 12
 stelleri diademata, 12, 474
Cyanocorax cassinii, 12
Cygnus buccinator, 104
 columbianus, 103
Cynanthus latirostris, 369
Cypseloides niger borealis, 790
Cyrtonyx montezumae mearnsi, 223

 Dab-chick, 81
Dafila acuta tzitzihua, 118
 Darter, 86
 Dawson, W. L., 29
 Dearborn, Ned, 34
Dendragapus obscurus obscurus, 196
Dendroica aestiva morecomi, 613
 aestiva rubiginosa, 615
 aestiva sonorana, 614
 auduboni auduboni, 616
 caerulescens caerulescens, 615
 cerulea, 619
 coronata hooveri, 616

- Dendroica fusca*, 620
 graciae, 621
 nigrescens, 12, 622
 olivacea, 791
 striata, 620
 townsendi, 624
 Desert Black-throated Sparrow, 732
 Horned Lark, 7, 448
 Sparrow, 6
 Sparrow Hawk, 193
Diatryma gigantea, 13
 steini, 13
 Dickcissel, 680
 Dipper, American, 531
Dolichonyx oryzivorus, 637
 Dove, Inca, 306
 Mexican Ground, 305
 Mourning, 7
 Turtle, 303
 Western Mourning, 299
 Western White-winged, 303
 White-winged, 6
 Dowitcher, Long-billed, 277
Dryobates arizonae arizonae, 410
 pubescens homorus, 404
 pubescens oreoecus, 12
 scalaris cactophilus, 407
 villosus icastus, 404
 villosus leucothorectis, 12, 403
 villosus monticola, 400
 Ducks:
 American Golden-eye, 139
 American Merganser, 147
 American Pintail, 118
 American Scaup, 136
 Baldpate, 116
 Blackhead, 137
 Bluebill, 137
 Blue-winged Teal, 124
 Broad-bill, 129
 Buffle-head, 141
 Butter-ball, 142
 Canvasback, 134
 Cinnamon Teal, 7, 126
 Creek Duck, 116
 Dun-diver, 148
 Gadwall, 115
 Goosander, 148
 Green-head, 111
 Green-winged Teal, 121
 Hooded Merganser, 145
 Lesser Scaup, 136
 Mallard, 109
 Merganser, 8
 Morocco-head, 148
 Ducks—Continued.
 New Mexican, 114
 Raft Duck, 137
 Red-breasted Merganser, 148
 Red-breasted Teal, 127
 Redhead, 132
 Ring-bill, 138
 Ring-necked, 138
 Ring-necked Black-head, 138
 Ring-necked Scaup, 138
 Ruddy, 7, 142
 Saw-bill, 148
 Shovel-bill, 129
 Shoveller, 7, 128
 Sheldrake, 148
 South American Teal, 127
 Spirit, 142
 Spoonbill, 129
 White-winged Scoter, 142
 Wood, 130
 Duck Hawk, 189
 Dumetella carolinensis, 554
 Dun-diver, 148
 Dusky Grouse, 7, 8, 10, 196
 Dutcher, B. H., 27
 Dwarf Cowbird, 663
 Hermit Thrush, 572
 Eagle, Bald, 180
 Golden, 176
 Egret, Lesser, 92
 Little, 92
 Snowy, 90
 Egretta thula thula, 90
 Elanoides forficatus, 154
 Elf Owl, 6, 326
 Emory, W. H., 18
 Empidonax difficilis, 764
 difficilis difficilis, 434
 fulvifrons pygmaeus, 440
 griseus, 440
 hammondi, 437
 trailli brewsteri, 437
 wrighti, 438
 English Sparrow, 681
 Ereunetes mauri, 278
 Erismatura jamaicensis rubida, 142
 Eskimo Curlew, 261
 Eugenus fulgens, 368
 Euphagus cyanocephalus cyanocephalus, 656
 Eupoda montana, 249
 Evermann, B. W., 23

- Falco columbarius columbarius*, 192
 columbarius richardsoni, 193
 fusco-coerulescens septentrionalis, 191
 mexicanus, 187
 peregrinus anatum, 189
 sparverius phalaena, 193
Ferruginous Rough-leg, 172
Finch, Black Rosy, 8, 697
 Brown-capped Rosy, 8, 698
 Cassin Purple, 8, 688
 Gray-crowned Rosy, 8, 695
 Hepburn Rosy, 8, 697
 House, 7, 689
 Pine, 699
Fisher, A. K., 27
Flammulated Screech Owl, 7, 318
Flycatcher, Arizona Crested, 423
 Ash-throated, 7, 424
 Buff-breasted, 7, 440
 Coues, 442
 Gray, 440
 Hammond, 437
 Little Traill, 437
 Olivaceous, 427
 Olive-sided, 8, 445
 Scissor-tailed, 421
 Sulphur-bellied, 427
 Vermilion, 6, 446
 Western, 8, 434
 Wright, 7, 438
Fly-up-the-Creek, 93
Ford, Fannie, 34
Forster Tern, 293
Fossil Birds, 13
Franklin Gull, 291
Fuertes, L. A., 29
Fulica americana, 243

Gadwall, 115
Gambel, William, 17
Gambel Quail, 6, 218
 Sparrow, 755
Gaut, J. H., 29
Gavia arctica pacifica, 74
 immer, 73
Geococcyx californianus, 309
Geothlypis trichas occidentalis, 628
Gila Woodpecker, 6, 381
Gilman, M. F., 32
Glaucidium gnoma pinicola, 12, 324
Glaucionetta clangula americana, 139
 islandica, 785
Glossary, 69
Gnatcatcher, Plumbeous, 6, 584
 Western, 7, 583
Golden Eagle, 176
Golden-eye, American, 139
Golden-crowned Kinglet, 8

Golden Pileolated Warbler, 633
Golden-winged Warbler, 608
Goldfinch, Arkansas, 7, 703
 Green-backed, 704
 Pale, 702
Goldman, E. A., 32
Goosander, 148
Goose, Canada, 104
 Hutchins, 106
 Snow, 107
 White-fronted, 107
Gopher Crane, 89
Grace Warbler, 7, 621
Grackle, Great-tailed, 658
Grasshopper Hawk, 195
Gray Flycatcher, 440
 Titmouse, 7, 510
 Vireo, 601
Gray-crowned Rosy Finch, 8, 695
Gray-headed Junco, 8, 742
Gray-tailed Cardinal, 6, 671
Greater Yellow-legs, 268
Great-tailed Grackle, 658
Grebe, American Eared, 76
 Black-necked, 77
 Horned, 75
 Pied-billed, 80
 Western, 79
Green, M. M., 34
Green-backed Goldfinch, 704
Green-head, 111
Green Heron, 92
Green-tailed Towhee, 7, 708
Green-winged Teal, 121
Grinnell Water-Thrush, 626
Grosbeak, Arizona Blue, 677
 Rocky Mountain Black-headed, 7, 674
 Rocky Mountain Evening, 7, 683
 Rocky Mountain Pine, 8, 694
 Rose-breasted, 673
 Western Blue, 6
Grouse, Columbian Sharp-tailed, 209
 Dusky, 7, 8, 10, 196
 Prairie Sharp-tailed, 209
 Sage, 211
Grus americana, 237
 canadensis canadensis, 12, 238
 fraterculus, 12
 mexicana, 239
Guara rubra, 100
Guiraca caerulea interfusa, 677
Gull, Franklin, 291
 Heermann, 292
 Laughing, 291
 Ring-billed, 289
 Sabine, 293
Gymnocitta cyanocephala, 773

- Haliaetus leucocephalus leucocephalus*, 180
 Hammond Flycatcher, 437
 Harris Hawk, 6, 173
 Sparrow, 751
 Hawks:
 American Osprey, 184
 American Rough-legged, 170
 Aplomado Falcon, 6, 191
 Audubon Caracara, 6, 186
 Blue Corporal, 192
 Bullet, 192
 Chicken, 163
 Cooper, 7, 160
 Desert Sparrow, 193
 Duck, 189
 Ferruginous Rough-leg, 172
 Grasshopper, 195
 Harris, 6, 173
 Hen, 163
 Marsh, 181
 Mexican Black, 175
 Mexican Goshawk, 175
 Mississippi Kite, 155
 Pigeon, 192
 Prairie Falcon, 187
 Red-bellied, 164
 Richardson Pigeon, 193
 Sharp-shinned, 7, 157
 Squalling, 172
 Squirrel, 173
 Swainson, 167
 Swallow-tailed Kite, 154
 Western Goshawk, 8, 156
 Western Red-tail, 161
 Zone-tailed, 165
Hedymeles ludovicianus, 673
 melanocephalus papago, 674
 Heermann, A. L., 13, 20
 Heermann Gull, 292
Heleodytes brunnicapillus couesi, 540
 Henderson, Junius, 34
 Hen Hawk, 163
 Henry, T. C., 13, 19
 Henshaw, H. W., 13, 21
 Hepatic Tanager, 7
 Hepburn Rosy Finch, 8, 697
 Heron, Black-crowned Night, 93
 Green, 92
 Little Snowy, 92
 Snowy, 90
 Treganza Blue, 87
Hesperiphona vespertina warreni, 683
Himantopus mexicanus, 283
Hirundo erythrogaster, 459
 Hollister, Ned, 30
 Honker, 105
 Hooded Merganser, 145
 Hoover Warbler, 616
 Horned Grebe, 75
 Horned Lark, Chihuahuah, 6, 452
 Desert, 448
 Montezuma, 452
 Saskatchewan, 452
 House Finch, 7, 689
 Howell, A. H., 30
 Howell Nighthawk, 346
 Hudsonian Curlew, 261
 Hummingbird, Arizona Blue-throated, 370
 Black-chinned, 7, 354
 Blue-throated, 7
 Broad-billed, 369
 Broad-tailed, 8, 357
 Calliope, 8, 366
 Costa, 6, 355
 Rivoli, 368
 Rufous, 362
 Hunn, J. T. S., 31
 Hutchins Goose, 106
Hylocichla fuscescens salicicola, 568
 guttata auduboni, 571
 guttata guttata, 570
 guttata nanus, 572
 guttata sequoiensis, 573
 ustulata ustulata, 569
 Ibis, Scarlet, 100
 White-faced Glossy, 100
 Wood, 98
Icteria virens longicauda, 629
Icterus bullocki bullocki, 654
 cucullatus nelsoni, 652
 parisorum, 649, 782
 spurius, 653
Ictinia mississippiensis, 155
 Inca Dove, 306
Iridoprocne bicolor, 456
 Itineraries, 15
Ixobrychus exilis, 97
Ixoreus naevius meruloides, 568
 Jay, Arizona, 479
 Long-crested, 8, 474
 Northern Blue, 473
 Pinyon, 7, 497
 Rocky Mountain Canada, 8, 470
 Woodhouse, 7, 476
 Jenkins, O. P., 23
 Jensen, J. K., 13, 36
 Jones, Lynds, 29
 Junco, Arizona, 740
 Gray-headed, 8, 742
 Montana, 738
 Pink-sided, 739
 Red-backed, 7, 740
 Shufeldt, 737
 Slate-colored, 736
 White-winged, 735

- Junco aikeni*, 735
 caniceps, 742
 dorsalis, 740
 hyemalis connectens, 12
 hyemalis hyemalis, 736
 mearnsi, 739
 oreganus montanus, 738
 oreganus shufeldti, 12, 737
 phaeonotus dorsalis, 12
 phaeonotus palliatus, 740

 Kalmbach, E. R., 35
 Kellogg, R. T., 13, 35
 Kennerly, C. B. R., 19
 Killdeer, 250
 Kingbird, 7, 414
 Arkansas, 7, 416
 Cassin, 6, 419
 Kingfisher, Belted, 373
 Texas, 376
 Kinglet, Ashy Ruby-crowned, 586
 Golden-crowned, 8
 Ruby-crowned, 8
 Western Golden-crowned, 585
 Kite, Mississippi, 155
 Swallow-tailed, 154

Lagopus leucurus altipetens, 202
Lampornis clemenciae bessophilus, 370
Lanius borealis, 596, 777
 ludovicianus excubitorides, 597
 Lark Bunting, 7, 719
 Lark, Chihuabua Horned, 452
 Desert Horned, 7, 448
 Montezuma Horned, 7, 452
 Saskatchewan Horned, 452
Larus atricilla, 291, 779
 delawarensis, 289
 heermanni, 292
 pipixcan, 291
 Laughing Gull, 291
 Lawrence Goldfinch, 705
 Lazuli Bunting, 7, 678
 Lead-colored Bush-tit, 7, 517
 Least Bittern, 97
 Sandpiper, 275
 Leopold, Aldo, 35
 Lesser Cliff Swallow, 465
 Egret, 92
 Prairie Chicken, 207
 Scaup Duck, 136
Leucosticte australis, 698
 tephrocotis littoralis, 697
 tephrocotis tephrocotis, 695
 Lewis Woodpecker, 7, 390
 Life zones, 6
 Ligon, J. S., 31
Limnodromus griseus scolopaceus, 277
 Lincoln Sparrow, 8, 758

 Little Brown Crane, 238
 Egret, 92
 Snowy, 92
 Traill Flycatcher, 437
 Lloyd Bush-tit, 7, 520
Lobipes lobatus, 285
 Localities visited, 37
 Long-billed Curlew, 7, 258
 Dowitcher, 277
 Long-crested Jay, 8, 474
 Longspur, Chestnut-collared, 762
 McCown, 760
 Long, S. H., 16
 Long-tailed Chat, 7, 629
 Chickadee, 8, 506
 Loon, 73
 Pacific, 74
Lophodytes cucullatus, 145
Lophopepla, 221
Lophortyx gambeli gambeli, 218
 Loring, J. A., 27
 Louisiana Tanager, 664
Loxia curvirostra bendirei, 706
 curvirostra stricklandi, 707
 Lucy Warbler, 609

 Macgillivray Warbler, 7, 626
 Magpie, American, 7, 481
 Mallard, 109
Mareca americana, 116
 Marsh, C. H., 22
 Marsh Hawk, 181
 Martin, Purple, 467
 McCall, G. A., 18
 McCown Longspur, 760
 Meadowlark, Rio Grande, 6, 638
 Western, 7, 639
 Mearns, E. A., 13, 28
 Mearns Quail, 7, 10, 223
 Woodpecker, 7, 386
Megasceryle alcyon alcyon, 373
Megaquiscalus major macrourus, 658
Melanerpes erythrocephalus, 383
 formicivorus, 786
Melanitta deglandi, 142
Meleagris gallopavo merriami, 231
 gallopavo silvestris, 230
Melopelia asiatica mearnsi, 303
Melospiza lincolni lincolni, 758
 melodia fallax, 756
 melodia merrilli, 758
 Merganser, 8
 American, 147
 Hooded, 145
 Red-breasted, 148
Merganser americanus, 773
Mergus americanus, 147
 serrator, 148, 787
 Merriam, C. H., 27

- Merriam Turkey, 7, 231
 Merrill, D. E., 35
 Merrill Song Sparrow, 758
 Metcalfe, O. B., 13
 Mexican Black Hawk, 175
 Chickadee, 7, 508
 Cliff Swallow, 465
 Cormorant, 84
 Creeper, 527
 Crossbill, 8, 707
 Goshawk, 175
 Ground Dove, 305
 Screech Owl, 7, 316
 Micropalama himantopus, 278
 Micropallas whitneyi whitneyi, 326
 Mimus polyglottos leucopterus, 551
 Mississippi Kite, 155
 Mitchell, W. I., 29
 Mockingbird, Western, 6, 551
 Molothrus ater artemisiae, 662
 ater ater, 659
 ater obscurus, 663
 Monkey Owl, 314
 Montana Junco, 738
 Montezuma Horned Lark, 7, 452
 Morocco-head, 148
 Morphnus anthracinus, 175
 Mourning Dove, 7
 Mountain Bluebird, 8, 576
 Chickadee, 7, 508
 Plover, 7, 249
 Song Sparrow, 7
 Muscivora forficata, 421
 Myadestes townsendi, 579
 Mycteria americana, 98
 Myiarchus cinerascens cinerascens, 424
 lawrencei olivascens, 427
 magister magister, 423
 Myiochanes pertinax pallidiventris, 442
 richardsoni richardsoni, 443
 Myiodynastes luteiventris, 427

 Nannus hiemalis pacificus, 537
 National and State Refuges, 9
 Nelson, E. W., 13
 Nephocetes niger borealis, 348
 Nettion carolinense, 121
 Nevada Redwing, 7, 647
 Savannah Sparrow, 721
 New Mexican Duck, 114
 Nighthawk, Howell, 346
 Pacific, 345
 Texas, 6, 346
 Western, 7, 342
 Nonpareil, 680
 Northern Black Swift, 348
 Blue Jay, 473
 Phalarope, 285
 Pileated Woodpecker, 380

 Northern Shrike, 596
 Varied Thrush, 568
 Violet-green Swallow, 8, 453
 Nucifraga columbiana, 501
 Numenius americanus americanus, 258
 americanus occidentalis, 11, 261
 hudsonicus, 261
 Nutcracker, Clark, 501
 Nuthatch, Pygmy, 7, 524
 Red-breasted, 8, 523
 Rocky Mountain, 7, 521
 Nuttallornis borealis, 445
 Nyctala acadica, 767
 Nycticorax nycticorax naevius, 93, 774
 Nyroca affinis, 136
 americana, 132
 collaris, 138
 marila, 136
 valisneria, 134

 Oberholseria chlorura, 708
 Olivaceous Flycatcher, 427
 Olive Warbler, 7, 612
 Olive-sided Flycatcher, 8, 445
 Olor buccinator, 768
 columbianus, 771
 Oporornis tolmiei, 626
 Orange-crowned Warbler, 7
 Orchard Oriole, 653
 Oreoscoptes montanus, 560
 Oriole, Arizona Hooded, 6, 652
 Bullock, 7, 654
 Orchard, 653
 Scott, 6, 649
 Osprey, American, 184
 Otocoris alpestris aphrasta, 452
 alpestris enthymia, 452
 alpestris leucolaema, 448
 alpestris occidentalis, 12, 452
 Otus asio, 763
 asio aiken, 318
 asio cineraceus, 316
 asio maxwelliae, 316
 flammeolus, 778
 flammeolus flammeolus, 318
 Ouzel, Water, 8, 531
 Oven-bird, 625
 Owl, Aiken Screech, 318
 American Barn, 315
 American Long-eared, 332
 Arizona Spotted, 7, 330
 Barn, 6
 Burrowing, 6, 7, 327
 Elf, 6, 326
 Flammulated Screech, 7, 318
 Mexican Screech, 7, 316
 Monkey, 314
 Pallid Horned, 320

- Owl, Pygmy, 7
 Rocky Mountain Pygmy, 324
 Saw-whet, 7, 337
 Short-eared, 334
 Western Horned, 324
Oxyechus vociferus vociferus, 250

 Pacific Loon, 74
 Nighthawk, 345
 Painted Bunting, 6, 680
 Redstart, 7, 634
Palaeoborus umbrosus, 13
 Pale Goldfinch, 702
 Palmer, Edward, 13
 Pallid Horned Owl, 320
Pandion haliaetus carolinensis, 184
Parabuteo unicinctus harrisi, 173
 Parrot, Thick-billed, 306
Parus albescens, 12
Passer domesticus, 681
Passerculus sandwichensis nevadensis, 721
Passerella iliaca schistacea, 729
Passerina amoena, 678
 ciris, 680
 Pectoral Sandpiper, 271
Pediocetes phasianellus campestris, 209
 phasianellus columbianus, 209
Pelecanus erythrorhynchos, 83
 Pelican, American White, 83
Penthestes atricapillus septentrionalis, 12, 506
 gambeli gambeli, 12, 508
 sclateri, 508
Perisoreus canadensis capitalis, 470
Petrochelidon albifrons albifrons, 462
 albifrons melanogastra, 465
 albifrons tachina, 465
Peucaea cassinii, 731
Peucedramus olivaceus, 612
 Pewee, Western Wood, 443
Phaeopus borealis, 261
Phainopepla, 6, 594
Phainopepla nitens, 594, 780, 782
Phalacrocorax vigua mexicanus, 84
Phalaenoptilus nuttalli nuttalli, 340
 Phalarope, Northern, 285
 Wilson, 287
Phasianus colchicus torquatus, 229
 Pheasant, Ring-necked, 229
 Phoebe, 428
 Black, 6, 433
 Say, 429
Pica pica hudsonia, 481
Picicorvus columbianus, 765, 773
Picoides americanus dorsalis, 411
 Pied-billed Grebe, 80
 Pigeon, Band-tailed, 7, 10, 296
 Pigeon Hawk, 192
Picolated Warbler, 8, 631
 Pine Finch, 699
 Siskin, 8, 699
Pinicola enucleator montana, 694
 Pink-sided Junco, 739
 Pintail, American, 118
 Pinyon Jay, 7, 497
Pipilo aberti, 12, 718
Pipilo fuscus mesoleucus, 714
 maculatus arcticus, 712
 maculatus montanus, 712
 Pipit, 8
 American, 588
Piranga hepatica oreopasma, 666
 ludoviciana, 664
 rubra cooperi, 12, 668
Pisobia bairdi, 273
 fuscicollis, 273
 melanotos, 271
 minutilla, 275
Plectrophanes melanomus, 12
Plegadis guarauna, 100
 Plover, American Black-bellied, 254
 Mountain, 7, 249
 Snowy, 247
 Upland, 262
 Plumbeous Gnatcatcher, 6, 584
 Vireo, 7, 603
Podilymbus podiceps podiceps, 80
Polioptila caerulea obscura, 583
 plumbea plumbea, 584
Polyborus cheriway auduboni, 186
Poocetes gramineus confinis, 724
 Poor-will, 7, 340
Poospiza belli nevadensis, 773
 Pope, John, 20
 Porzana carolina, 242
 Prairie Chicken, Lesser, 207
 Falcon, 187
 Sharp-tailed Grouse, 209
Progne subis subis, 467
Psaltiriparus melanotis lloydi, 520
 plumbeus, 517
 Ptarmigan, Alaska Willow, 206
 Southern White-tailed, 202
 White-tailed, 8, 10
 Purple Martin, 467
 Pygmy Nuthatch, 7, 524
 Owl, 7
Pyrocephalus rubinus mexicanus, 446
Pyrrhuloxia, Arizona, 6, 672
 Texas, 673
Pyrrhuloxia sinuata sinuata, 672
 sinuata texana, 673
 Quail, Arizona Scaled, 6, 7, 215
 Blue, 216, 217
 Cotton Top, 216

- Quail, Gambel, 6, 218
 Mearns, 7, 10, 223
 Scaled, 216, 217
Querquedula cyanoptera, 126
 discors, 124

 Raft Duck, 137
 Rail, Virginia, 241
Rallus virginianus, 241
 Raven, 7
 American, 487
 White-necked, 6, 489
Recurvirostra americana, 281
 Red-backed Junco, 7, 740
 Red-bellied Hawk, 164
 Red-breasted Merganser, 148
 Nuthatch, 8, 523
 Teal, 127
 Red-faced Warbler, 7, 630
 Redhead, 132
 Red-headed Woodpecker, 383
 Red-naped Sapsucker, 8, 394
 Red-shafted Flicker, 7, 377
 Redstart, American, 633
 Painted, 7, 634
 Redwing, Nevada, 7, 647
 Sonora, 646
 Thick-billed, 647
Regulus satrapa olivaceus, 585
Rhynchopsitta pachyrhyncha, 306
Rhynchophanes mccowni, 760
 Richardson Pigeon Hawk, 193
Richmondia cardinalis canicaudus, 671
 cardinalis superbus, 670
 Ring-bill, 138
 Ring-billed Gull, 289
 Ring-necked Black-head, 138
 Duck, 138
 Pheasant, 229
 Scaup, 138
 Rio Grande Meadowlark, 6, 638
Riparia riparia riparia, 457
 Rivoli Hummingbird, 368
 Road-runner, 6, 309
 Robin, Western, 7, 563
 Rock Wren, 7, 547
 Rocky Mountain Black-headed Gros-
 beak, 674
 Canada Jay, 8, 470
 Creepers, 8, 528
 Evening Grosbeak, 7, 683
 Hairy Woodpecker, 7, 400
 Nuthatch, 7, 521
 Orange-crowned Warbler, 611
 Pine Grosbeak, 8, 694
 Pygmy Owl, 324
 Sapsucker, 8, 397
 Song Sparrow, 756

 Rose-breasted Grosbeak, 673
 Rough-winged Swallow, 458
 Ruby-crowned Kinglet, 8
 Ruddy Duck, 7, 142
 Rufous Hummingbird, 362
 Russet-backed Thrush, 569

 Sabine Gull, 293
 Sage Grouse, 211
 Hen, 211
 Sparrow, 7, 734
 Thrasher, 7, 560
 Sagebrush Cowbird, 602
Salpinctes obsoletus obsoletus, 547
 Sanderling, 280
 Sandhill Crane, 239
 Sandpiper, Baird, 273
 Least, 275
 Pectoral, 271
 Solitary, 266
 Spotted, 264
 Stilt, 278
 Western, 278
 Western Solitary, 266
 White-rumped, 273
 Saskatchewan Horned Lark, 452
 Saw-bill, 148
 Saw-whet Owl, 7, 337
 Say Phoebe, 429
Sayornis nigricans semiatra, 433
 phoebe, 428
 sayus, 429
 Scaled Quail, Arizona, 215, 216, 217
Scardafella inca, 306
 Scarlet Ibis, 100
 Scissor-tailed Flycatcher, 421
 Scott Oriole, 6, 649
 Sparrow, 7, 730
Sciuurus aurocapillus, 625
 noveboracensis notabilis, 626
Selasphorus platycercus, 357
 rufus, 362
 Seton, E. T., 13, 28
Setophaga picta, 634
 ruticilla, 633
 Sharp-shinned Hawk, 7, 157
 Sheldrake, 148
 Short-eared Owl, 334
 Shovel-bill, 129
 Shoveller, 7, 128
 Shrike, Northern, 596
 White-rumped, 7, 597
 Shufeldt, R. W., 13, 23
 Shufeldt Junco, 737
Sialia currucoides, 576
 mexicana bairdi, 573
 sialis sialis, 573
 Sierra Hermit Thrush, 573
 Simpson, J. H., 16

- Siskin, Pine, 8, 699
Sitta canadensis, 523
 carolinensis nelsoni, 521
 pygmaea pygmaea, 524
 Slate-colored Fox Sparrow, 729
 Junco, 736
 Sloan, Mrs. A., 34
 Snake Bird, 86
 Snipe, Wilson, 256
 Snowbird, 205
 Snow Goose, 107
 Snowy Egret, 90
 Heron, 90
 Plover, 247
 Solitaire, Townsend, 8, 579
 Solitary Sandpiper, 266
 Sonora Red-wing, 646
 Yellow Warbler, 614
 Sora, 242
 South American Teal, 127
 Southern White-tailed Ptarmigan, 202
 Sparrow, Baird, 723
 Black-chinned, 7, 750
 Brewer, 7, 747
 Cassin, 6, 731
 Clay-colored, 747
 Desert, 6
 Desert Black-throated, 732
 English, 681
 Gambel, 755
 Harris, 751
 Lincoln, 8, 758
 Merrill Song, 758
 Mountain Song, 7
 Nevada Savannah, 721
 Rocky Mountain Song, 756
 Sage, 7, 734
 Scott, 7, 730
 Slate-colored Fox, 729
 Western Chipping, 7, 745
 Western Grasshopper, 722
 Western Lark, 7, 727, 743
 Western Tree, 743
 Western Vesper, 7, 724
 White-crowned, 8, 752
 White-throated, 756
 Worthen, 7, 749
Spatula clypeata, 128, 780
Speotyto cunicularia hypogaea, 327
Sphyrapius thyroideus, 788
 thyroideus nataliae, 397
 varius nuchalis, 12, 394
Spinus pinus pinus, 699
 Spirit Duck, 142
Spiza americana, 680, 769, 774
Spizella atrogularis, 750
 breweri, 747, 789
 monticola ochracea, 743
 pallida, 747
Spizella passerina arizonae, 745
 wortheni, 12, 749
 Spoonbill, 129
 Spotted Sandpiper, 264
 Spurred Towhee, 7, 712
 Squalling Hawk, 172
Squatarola squatarola, 254
 Squirrel Hawk, 173
 Stake Driver, 97
Steganopus tricolor, 287
 Stejneger, L. H., 13
Stelgidopteryx serripennis, 458
Stellula calliope, 366
 Stephens, Frank, 13, 22
 Stephens Vireo, 600
 Whip-poor-will, 7, 339
Sterna forsteri, 293
 Stevenson, J., 13
 Stilt, Black-necked, 283
 Sandpiper, 278
Strix occidentalis lucida, 330
Sturnella magna hoopesi, 638
 neglecta neglecta, 639
 Sulphur-bellied Flycatcher, 427
 Surber, McClure, 31
 Swainson Hawk, 167
 Swallow, Bank, 457
 Barn, 459
 Cliff, 462
 Lesser Cliff, 465
 Mexican Cliff, 465
 Northern Violet-green, 8, 453
 Rough-winged, 458
 Tree, 456
 Swallow-tailed Kite, 154
 Swan, Trumpeter, 104
 Whistling, 103
 Swan Grebe, 80
 Swift, Chimney, 350
 Northern Black, 348
 White-throated, 7, 351
Sylvicola nigricans, 12
Syrnium occidentale, 779

Tachycineta thalassina lepida, 453
 Tanager, Arizona Hepatic, 666
 Cooper Summer, 7, 668
 Hepatic, 7
 Louisiana, 664
 Western, 7, 664
 Teal, Blue-winged, 124
 Cinnamon, 7, 126
 Green-winged, 121
 Red-breasted, 127
 Technical terms, 69
Telmatodytes palustris plesius, 12
 palustris plesius, 544

- Tern, American Black, 294
 Forster, 293
 Texas Bob-white, 6, 213
 Kingfisher, 376
 Nighthawk, 6, 346
 Pyrrhuloxia, 673
 Thick-billed Parrot, 306
 Red-wing, 647
 Thrasher, Bendire, 6, 557
 Crissal, 6, 558
 Curve-billed, 6, 555
 Sage, 7, 560
 Thrush, Alaska Hermit, 570
 Audubon Hermit, 8, 571
 Dwarf Hermit, 572
 Northern Varied, 568
 Russet-backed, 569
 Sierra Hermit, 573
 Willow, 7, 568
 Thryomanes bewickii eremophilus, 12, 538
 Thryothorus ludovicianus ludovicianus, 538
 Thunder Pumper, 97
 Titmouse, Bridled, 7, 513
 Gray, 7, 510
 Totanus flavipes, 270
 melanoleucus, 268
 Towhee, Abert, 6, 718
 Arctic, 712
 Canyon, 7, 714
 Green-tailed, 7, 708
 Spurred, 7, 712
 Townsend Solitaire, 8, 579
 Warbler, 624
 Toxostoma bendirei, 557
 crissale, 12, 558
 curvirostre curvirostre, 555
 Tree Swallow, 456
 Treganza Blue Heron, 87
 Tringa solitaria cinnamomea, 266
 solitaria solitaria, 266
 Triorchis ferrugineus, 172
 lagopus sancti-johannis, 170
 Trochilus alexandri, 792
 Troglodytes aedon parkmani, 535
 Trogon, Coppery-tailed, 372
 Trogonurus ambiguus, 372
 Trumpeter Swan, 104
 Turdus migratorius propinquus, 563
 Turkey, Merriam, 7, 231
 Wild, 10, 230
 Water, 86
 Turkey Vulture, 151
 Turtle Dove, 303
 Tympanuchus pallidicinctus, 207
 Tyrannus tyrannus, 414, 774, 777
 verticalis, 416
 vociferans, 419
 Tyto alba pratincola, 315
 Upland Plover, 262
 Value of birds, 8
 Verdin, 6, 514
 Vermilion Flycatcher, 6, 446
 Vermivora celata orestera, 12, 611
 chrysoptera, 608
 luciae, 609
 virginiae, 12, 609
 Vireo, Arizona Least, 601
 Cassin, 602
 Gray, 601
 Plumbeous, 7, 603
 Stephens, 600
 Western Warbling, 605
 Vireo belli arizonae, 601
 gilva swainsoni, 605
 huttoni stephensi, 600
 solitarius cassini, 602
 solitarius plumbeus, 603
 vicinior, 601
 Virginia Rail, 241
 Warbler, 7, 609
 Vulture, Turkey, 151
 Warbler, Alaska Yellow, 615
 Audubon, 7, 616
 Blackburnian, 620
 Black-poll, 620
 Black-throated Blue, 615
 Black-throated Gray, 7, 622
 Cerulean, 619
 Golden Pileolated, 633
 Golden-winged, 608
 Grace, 7, 621
 Hoover, 616
 Lucy, 609
 Macgillivray, 7, 626
 Olive, 7, 612
 Orange-crowned, 7
 Pileolated, 8, 631
 Red-faced, 7, 630
 Rocky Mountain Orange-crowned, 611
 Sonora Yellow, 614
 Townsend, 624
 Virginia, 7, 609
 Western Yellow, 613
 Western Yellow-throat, 7
 Yellow, 7
 Water-ouzel, 8, 531
 Water-thrush, Grinnell, 626
 Water Turkey, 86
 Waxwing, Bohemian, 591
 Cedar, 592
 Western Blue Grosbeak, 6
 Chipping Sparrow, 7, 745
 Crow, 7, 494

- Western Flycatcher, 8, 434
 - Gnatcatcher, 7, 583
 - Golden-crowned Kinglet, 585
 - Goshawk, 8, 156
 - Grasshopper Sparrow, 722
 - Grebe, 79
 - Horned Owl, 324
 - House Wren, 7, 535
 - Lark Sparrow, 7, 727
 - Marsh Wren, 7, 544
 - Meadowlark, 7, 639
 - Mockingbird, 6, 551
 - Mourning Dove, 299
 - Nighthawk, 7, 342
 - Red-tail, 161
 - Robin, 7, 563
 - Sandpiper, 278
 - Solitary Sandpiper, 266
 - Tanager, 7, 664
 - Tree Sparrow, 743
 - Vesper Sparrow, 7, 724
 - Warbling Vireo, 605
 - White-winged Dove, 303
 - Willet, 267
 - Winter Wren, 537
 - Wood Pewee, 7, 443
 - Yellow-throat, 7, 628
 - Yellow Warbler, 613
- Wetmore, Alexander, 36
- Whip-poor-will, Stephens, 7, 339
- Whistling Swan, 103
- White-breasted Woodpecker, 7, 403
- White-crowned Sparrow, 8, 752
- White-faced Glossy Ibis, 100
- White-fronted Goose, 107
- White-necked Raven, 6, 489
- White-rumped Sandpiper, 273
 - Shrike, 7, 597
- White-tailed Ptarmigan, 8, 10
- White-throated Sparrow, 756
 - Swift, 7, 351
- White-winged Dove, 6,
 - Junco, 735
 - Scoter, 142
- Whooping Crane, 237
- Wild Turkey, 10, 230
- Willet, Western, 267
- Willett, George, 36
- Willow Thrush, 7, 568
- Wilson, S. S., 28
- Wilson Phalarope, 287
 - Snipe, 256
- Wilsonia pusilla chryseola, 633
 - pusilla pileolata, 631
- Winship, G. P., 16
- Woodhouse, S. W., 13, 19
- Woodhouse Jay, 7, 476
- Wood Duck, 130
 - Ibis, 98
- Woodpecker, Alpine Three-toed, 8, 411
 - Arizona, 7, 410
 - Batchelder, 404
 - Cactus, 6, 407
 - Chihuahua, 404
 - Gila, 6, 381
 - Lewis, 7, 390
 - Mearns, 7, 386
 - Northern Pileated, 380
 - Red-headed, 383
 - Red-naped Sapsucker, 8, 394
 - Red-shafted Flicker, 7, 377
 - Rocky Mountain Hairy, 7, 400
 - Rocky Mountain Sapsucker, 8, 397
 - White-breasted, 7, 403
- Wood Pewee, Western, 7
- Worthen Sparrow, 7, 749
- Wren, Baird Bewick, 7, 538
 - Cactus, 6, 540
 - Canyon, 6, 545
 - Carolina, 538
 - Rock, 7, 547
 - Western House, 7, 535
 - Western Marsh, 7, 544
 - Western Winter, 537
- Wright Flycatcher, 7, 438
- Xanthocephalus xanthocephalus, 642
- Xema sabini, 293
- Yellow-billed Cuckoo, 308
- Yellow-headed Blackbird, 7, 642
- Yellow-legs, 270
 - Greater, 268
- Yellow-throat, Western, 628
- Yellow Warbler, 7
 - Western, 613
- Zamelodia melanocephala, 771
- Zenaidura macroura, 769
 - macroura carolinensis, 787
 - macroura marginella, 299
- Zonal distribution, 6
- Zones, Life, 6
- Zone-tailed Hawk, 165
- Zonotrichia albicollis, 756
 - gambeli, 755
 - leucophrys, 752
 - querula, 751, 769, 774



